MEDView

MEDDiag

User Manual

3.1.1 version

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MEDWS complies with the Medical Devices Directive 93/42/EEC of 14 June 1993 modified by the directive 2007/47/EEC of .5 September 2007
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MEDVIEW and MEDDIAG are variants of MEDWS product.

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1 Information about security

Information about security is presented here, in order to reduce risks when using the workstation.

1.1 Hardware conformance

The hardware used for MEDWS must follow the requirements defined in the corresponding section. It is also important to read carefully and to follow the safety instructions linked to the material in order to decrease the risks of injuries from electric shock, energy, fire, thermal hazards, radiation hazards, and chemical hazards. Finally it is important to understand that the material could be sensitive of electromagnetic interference.

1.2 Image communication.

Communication with DICOM nodes must be checked at installation. Then, the person in charge of the installation should be aware of any modifications, in order to update the configuration of the station.

1.3 Patient Information.

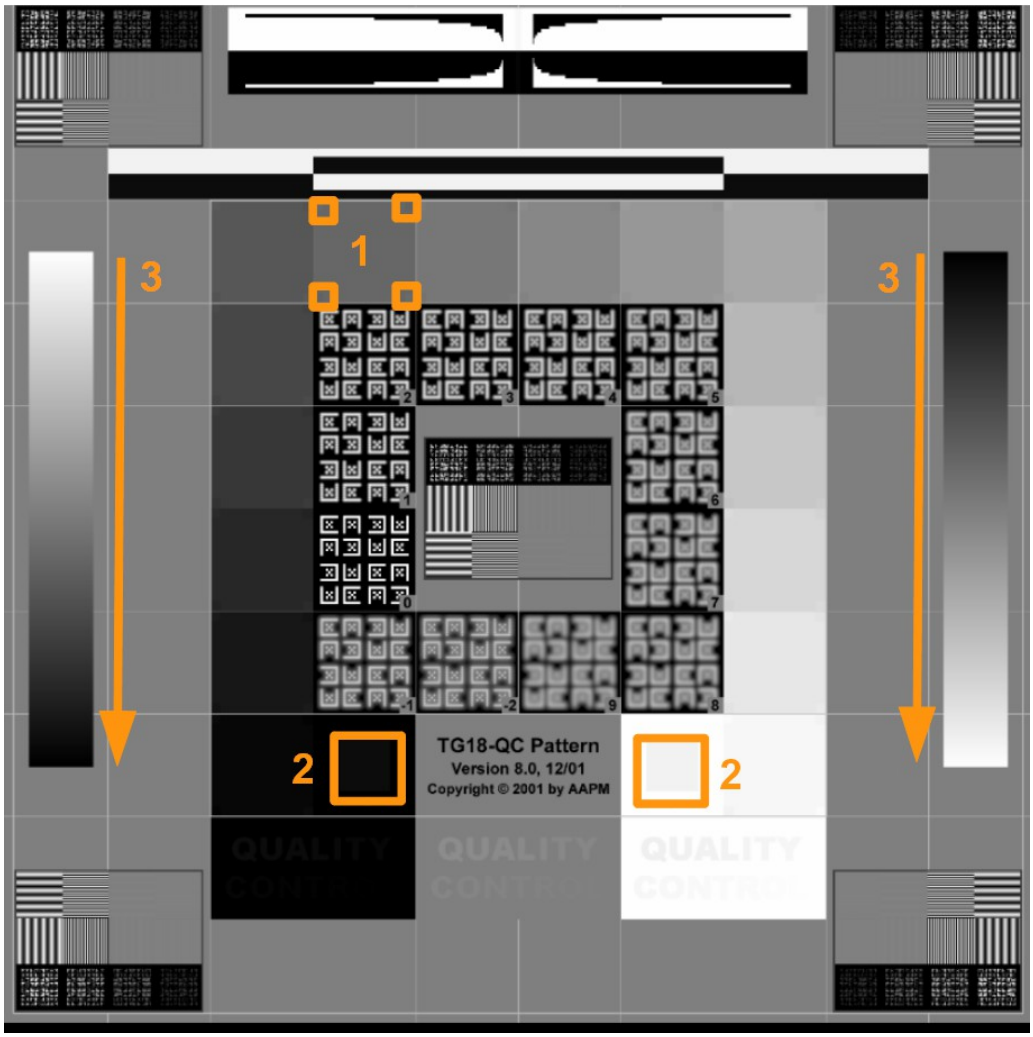
Confusion on patient identity is a usual source of errors when using workstations. To reduce these errors, information on patient is displayed **on each image** : **patient's name, study date, patient's orientation, laterality** (if present in DICOM image). The prior studies are also identified. See the section “ Display patient information” for further details.

1.4 Image display

Image quality for each acquisition modality must be validated by the radiologist.

If the station is used for diagnosis, it is highly recommended to check the display of pattern images every day to detect failures ('dead pixels', calibration error) which can lead to a bad image display :

- Verify the viewing conditions, especially for ambient brightness, and the screen viewing angle.
- Display the pattern TG18-QC 'Options – Display calibration images' :
- Check the following steps as described on following illustration
    1. In the 16 concerned squares, all the lowest brightness must be visible.
    2. Grey-levels from 5% to 95% must be visible.
    3. Black-white transitions do not have to present jaggy or transition artefact, blinks or blur.



Display of images is optimum when one pixel of the image is displayed on one pixel of the screen, that is to say when the display zoom is 100%. For a smaller zoom images are sub-sampled, which means there is a loss of information. In diagnostic mode display zoom is displayed as overlay on the image. Caution : in print mode, the print zoom is displayed.

When an image has been compressed with loss of information compared to the original image, the text 'Lossy image compression : 01 ' is displayed on the image. See section “Display patient information” to see an example.

1.5 Measures

The accuracy of measure depends on the following points, detailed in the section “ Add Measures “ of the user manual :

- Image resolution

- Calibration done by modality station
- Conditions of creating measure on the workstation.

1.6 Exporting Images

When exporting images, the following formats use a lossy compression, which means that an amount of data contained in the original pixels is discarded : JPEG, AVI. For grey level original images with pixels saved on more than 8 bits per pixel the following formats will also result in a lossy compression : BMP, PNG. See the chapter 'Exporting images' for more details.

When exporting images, only the DICOM format preserves the meta information (patient identification, study description,...). For all other formats meta information is loss.

1.7 Printing

A list of drivers is provided by default at the installation for DICOM printers. Those drivers are correctly configured according to the 'DICOM Conformance Statement' of the printer, they are tested and approved. It is imperative to contact our customer service if you wish to connect a printer which is not on the provided list.

It is possible to define a printing zoom which is defined by reference to the real size. The print zoom accuracy depends on calibration done by the acquisition station, as detailed in the section “ Printing a study on a film “.

When an image has been compressed with loss of information compared to the original image, the text 'Lossy image compression : 01 ' is printed on the image. See section “Format and print a study on a film” to see an example.

1.8 Stitching

Stitching option allows the user to generate one single DICOM image from several images with an overlap. The result images must always be validated by the radiologist, to validate the result of stitching algorithm. Dedicated tools are available to validate the stitching and to correct dynamically the result image. Please see the corresponding chapter for more details.

1.9 Breast detection

On mammography workstation an automatic detection of the breast is processed. If the detection fails and that a part of the image is not displayed, it is possible to cancel the detection and to display the whole image. Please see the corresponding chapter for more details.

2 System requirements

This paragraph describe the system requirements for the workstation.

2.1 PC

The hardware must conform to the standards :

- IEC 60950-1 standard for safety
- IEC 61000-3-2, IEC 61000-3-3, EN 55022 et EN 55024 standards for IEC

Moreover, it has to be linked to the earth during the installation with an additional fixed ground terminal. It is also recommended to install the equipment with a backup power supply (UPDS) to avoid outage.

2.1.1 Minimal configuration

Operating system :	• Windows XP Professionnal SP3 or Windows 7
Free disk space :	• 150 Mb for the software
Hardware characteristics :	• 1 Gb of RAM • Processor Pentium Core 2 • OpenGL 2.0 compatible graphic controller (Chipset or graphic card) • 100 Mbps TCP/IP network card

2.1.2 Recommended configuration

Operating system :	• Windows XP Professionnal SP3 or Windows 7
Free disk space :	• 150 Mb for the software
Hardware characteristics:	• 2 Gb of RAM • Intel Pentium Processor G645 (Dual Core, 2.9GHz, 3MB, w/ Integrated HD Graphics) • OpenGL 3.1 compatible graphic card • 1 Gbps TCP/IP network card

2.2 Screens

2.2.1 Diagnostic use.

If the workstation is used to visualize images for diagnostic, the requirements for the screens to visualize images must meet the following :

- CE mark for medical devices or FDA agreement.
- DICOM part 14 conformance .

- Minimal resolution :1280x1024
- Recommended resolution : 1600x1200 in true colors or 20" in grey levels.

2.2.2 'Simple' use.

If the workstation is not used to visualize images for diagnostic, the requirements for the screens to visualize images should meet the following :

- Resolution : 1280 * 1024 in true colors (32 bits)
- 19" professional quality.

2.3 Printers

2.3.1 DICOM Printers

The workstation prints on DICOM lasers.

2.3.2 Windows Printers

The workstation prints on standard printer for a non diagnosis use. The windows driver for the printer needs to be installed.

3 Other Requirements

3.1 Pre-requisite softwares

Adobe Acrobat Reader is needed to display the help on line.

3.2 Internet connection

To get the telemaintenance access, an Internet connection is needed.

3.2.1

4 About this Guide

The manual follows some writing convention to get an easy reading.

4.1 Mouse icons

- : Left button on the mouse
- : Double-click on the right button on the mouse
- : Right button on the mouse
- : Mouse wheel
- : Mouse wheel upwards
- : Mouse wheel downwards

4.2 Abbreviations

The manual uses some keyboard abbreviations :

CTRL = Control key.
CTRL + C = Control key + C key.
SHIFT = SHIFT key.
ALT = ALT key.

4.3 Notations

Tip : Tips are used to indicate information which may be helpful for the reader.

Warning : Warning messages indicate an important information for the reader. Please, read carefully the explanation which, if not read, could result in error conditions.

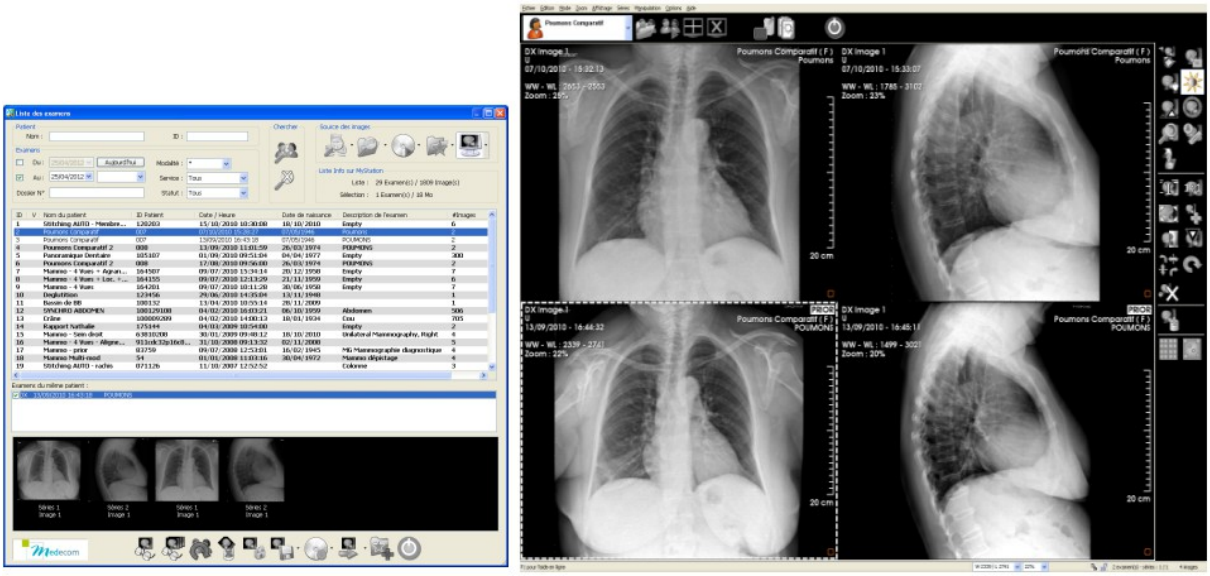
5 Overview

The MEDWS software (MEDVIEW, MEDDIAG, MEDMAMMO) is intended for selection, display, manipulation and media interchange of medical images, including mammograms. It can show images from different modalities and interfaces to various image storage and printing device using DICOM or similar interface standards.

Lossy compressed mammographic images are not intended for diagnostic review. Mammographic images should only be viewed with a monitor approved by FDA for viewing mammographic images. For primary diagnosis, post process DICOM for presentation images must be used.

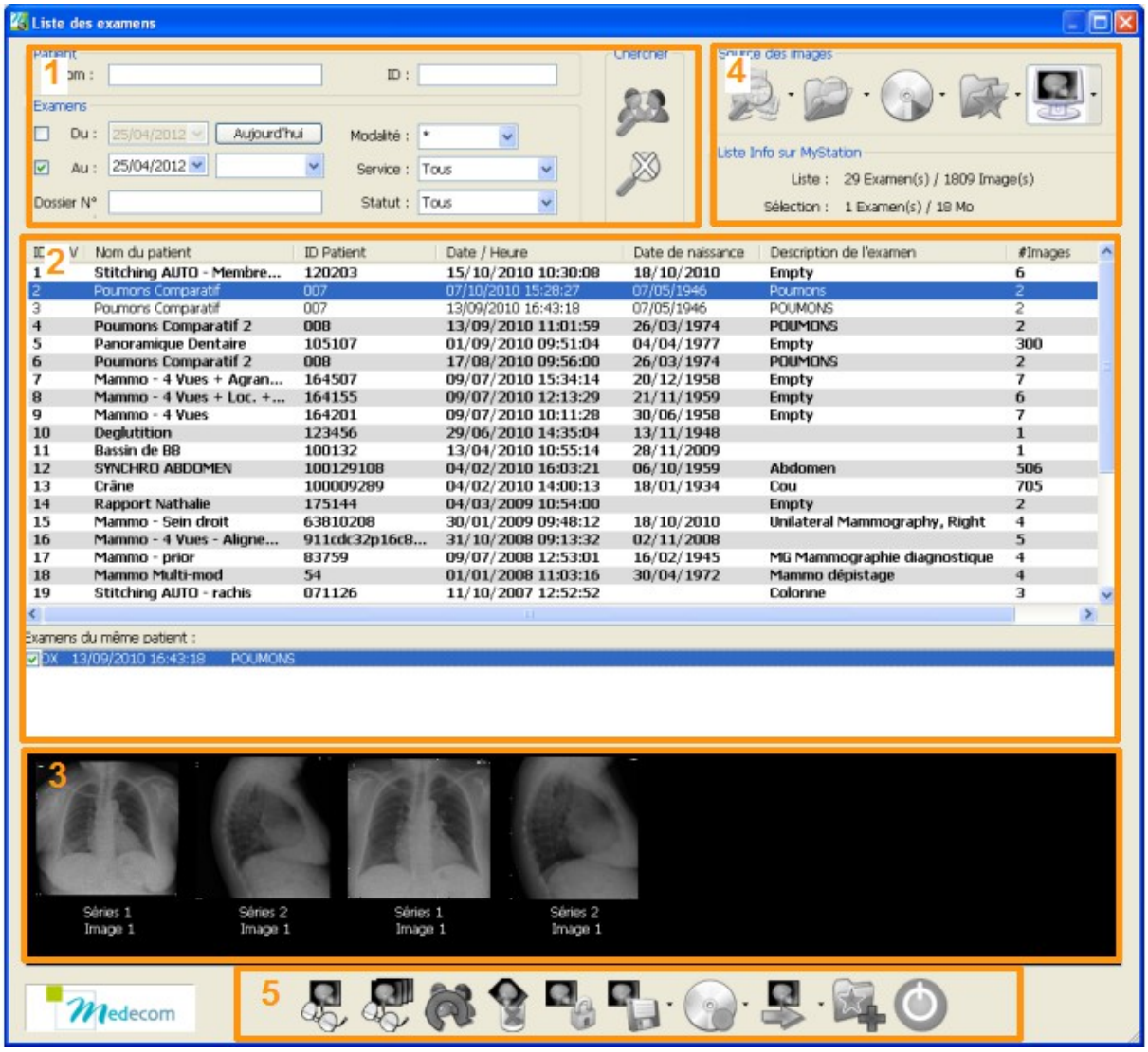
The MEDWS software (MEDVIEW, MEDDIAG, MEDMAMMO) is typically used by trained professionals including but not limited to physicians, radiologists, nurses, medical technicians and assistants.

The following illustration presents an overview of the interface when used with two screens : on the left is the Study List, and on the right the images with the corresponding toolbars.



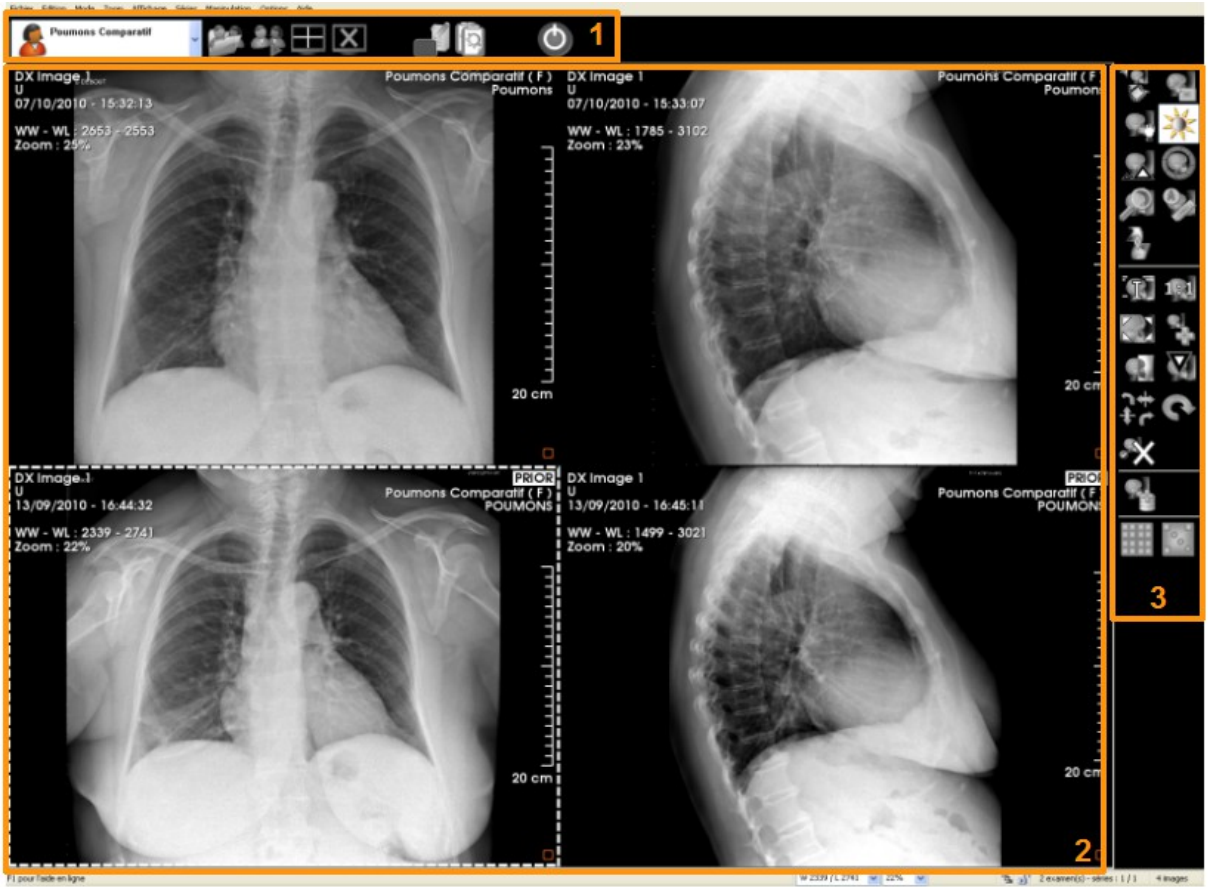
The study list contains the followings elements :

1. Search filters for studies,
2. Study list and corresponding information,
3. Pre-visualisation of images from selected selected studies,
4. Tools for selection of image source,
5. Tools to handle selected studies (transfer, copy, burn,...)


Liste des examens
1
Patient
Nom :
ID :
Chercher
Examens
Du :
25/04/2012
Aujourd'hui
Modalité :
Au :
25/04/2012
Service :
Tous
Dossier N°
Statut :
Tous
4
Source des images
Liste Info sur MyStation
Liste : 29 Examen(s) / 1809 Image(s)
Sélection : 1 Examen(s) / 18 Mo
2
ID V Nom du patient ID Patient Date / Heure Date de naissance Description de l'examen #Images
1 Stitching AUTO - Membre... 120203 15/10/2010 10:30:08 18/10/2010 Empty 6
2 Poumons Comparatif 007 07/10/2010 15:28:27 07/05/1946 Poumons 2
3 Poumons Comparatif 007 13/09/2010 16:43:18 07/05/1946 POUMONS 2
4 Poumons Comparatif 2 008 13/09/2010 11:01:59 26/03/1974 POUMONS 2
5 Panoramique Dentaire 105107 01/09/2010 09:51:04 04/04/1977 Empty 300
6 Poumons Comparatif 2 008 17/08/2010 09:56:00 26/03/1974 POUMONS 2
7 Mammo - 4 Vues + Agran... 164507 09/07/2010 15:34:14 20/12/1958 Empty 7
8 Mammo - 4 Vues + Loc. +... 164155 09/07/2010 12:13:29 21/11/1959 Empty 6
9 Mammo - 4 Vues 164201 09/07/2010 10:11:28 30/06/1958 Empty 7
10 Deglutition 123456 29/06/2010 14:35:04 13/11/1948 1
11 Bassin de BB 100132 13/04/2010 10:55:14 28/11/2009 1
12 SYNCHRO ABDOMEN 100129108 04/02/2010 16:03:21 06/10/1959 Abdomen 506
13 Crâne 100009289 04/02/2010 14:00:13 18/01/1934 Cou 705
14 Rapport Nathalie 175144 04/03/2009 10:54:00 Empty 2
15 Mammo - Sein droit 63810208 30/01/2009 09:48:12 18/10/2010 Unilateral Mammography, Right 4
16 Mammo - 4 Vues - Aligne... 911cdc32p16c8... 31/10/2008 09:13:32 02/11/2008 5
17 Mammo - prior 83759 09/07/2008 12:53:01 16/02/1945 MG Mammographie diagnostique 4
18 Mammo Multi-mod 54 01/01/2008 11:03:16 30/04/1972 Mammo dépistage 4
19 Stitching AUTO - rachis 071126 11/10/2007 12:52:52 Colonne 3
Examens du même patient :
DX 13/09/2010 16:43:18 POUMONS
3
Séries 1 Image 1
Séries 2 Image 1
Séries 1 Image 1
Séries 2 Image 1
5

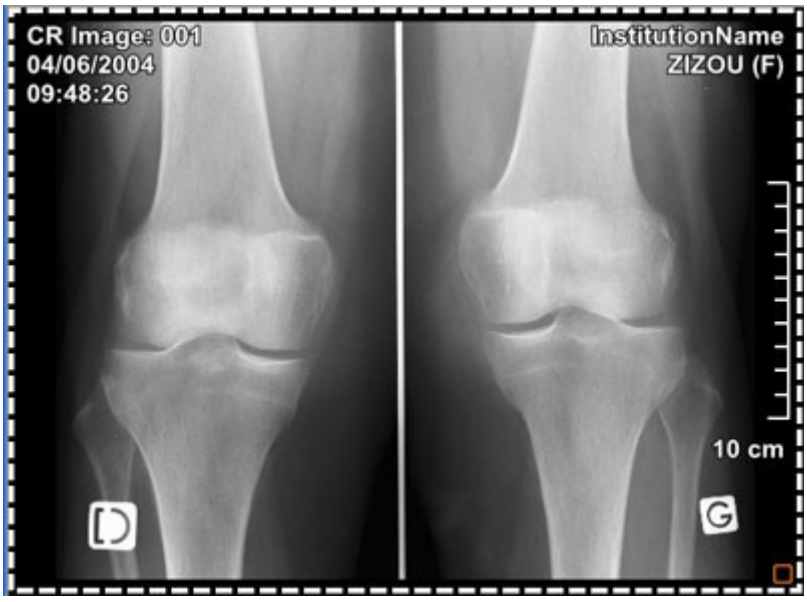
The image display zone contains the following elements :

1. Toolbar to handle displayed studies,
2. Image visualisation,
3. Toolbar to handle displayed images.



For each image, the following information are displayed :

- Information on study and image
- Ruler
- Active image frame, here with a with dot line.
- Image selection box (red square bottom-right red square)



This manual describes MEDWS tools in a teaching mode by explaining simple actions, for example “How to do a video inversion”.

6 Toolbars Description

6.1 Study toolbar

	Display the list of available examinations
	Open the most recent unread examination or series
	Activation of multi-series mode
	Close active series
	Move to previously opened series
	Synchronise series (available according to version)
	Move to following open series
	Activation of print mode (print mode according to version)
	Film formatter (available according to version)
	List of the status of the printing of the last films: spooled, printed, error
	Close software

6.2 Image toolbar

Some icons allow an operating mode to be activated (each mode has a function associated with the mouse):

	Selection Mode (layout of images in required order)
	Panning Mode (movement within an image)
	Windowing Mode (contrast / brightness)
	Zoom Mode
	Shutter Mode
	Measurement and Annotation Mode
	Magnifying Glass Mode
	Tile/Stack Mode

Some icons allow an action to be taken with the images:

	Zoom Full Resolution (1 image pixel = 1 screen pixel) If the print mode is active, 1 cm on the image = 1 cm on the film
	Zoom Fit (fits image in the viewport)
	Duplicate an image
	Open the filtering toolbar

	Activation of stitching
	Open the toolbar for geometric handling
	Video Invert
	Open LUT dialog box
	Open the cinema-loop mode dialog box
	Reload image(s) with the default values
	Move to previous page
	Move to next page
	Display all images on the open series on the screen
	Selection of a display matrix
	Delete active image or selected images from the viewer

6.3 Manipulation toolbar

	180° rotation
	Horizontal mirror
	Vertical mirror
	Rotate 90 degrees to the right
	Rotate 90 degrees to the left
	Cancel all geometric actions carried out on an image

6.4 Annotation toolbar

	Addition of a text from keyword list or not from keyword list
	Addition of an arrow
	Addition of a single line
	Addition of a line with round end
	Addition of a segment with the middle of this segment
	Addition of a segment and a segment at right angles to it
	Addition of a rectangle
	Addition of a circle drawn from a centre
	Addition of a circle drawn from 3 points on the circle
	Delete all measurements and annotations
	Exit measurement / annotation mode

6.5 Measurement toolbar

	Measure a length
	Measure a difference in length between two segments
	Measure the cardio-thorax index
	Measure an angle
	Measure an open angle
	Measure an angle from an intersection
	Measure multiple open angles
	Measure goniometry
	Measure a difference in height
	Measure an elliptical surface
	Measure a polygonal surface
	Measure density (in Hounsfield units for CT images)
	Calibration of the image
	Delete all measurements and annotations
	Exit measurement / annotation mode

7 Keyboard Shortcuts

7.1 Function Keys

Key	Action
F1	User manual display
F2	Print
F3	Print Queue Dialog Box
F5	Study list display
F8	Settings Dialog box
F9	DICOM information on active image
F10	Image acquisition
ESCAPE	Full screen mode

7.2 Files Menu Shortcuts

Key	Action
CTRL + O	Open a file
CTRL + E	Save the active image in a file
CTRL + G	Save all images displayed in one single image
ALT + F4	Close software

7.3 Clipboard Shortcuts

Key	Action
CTRL + C	Copy active image to clipboard
CTRL + X	Copy active image to clipboard AND delete viewer

7.4 Access to the context menu

The context menu allows faster access to the different application functions using just one right click anywhere on the image. This menu is automatically modified depending on the active mode.

Key	Action
on image	Displaying the context menu and functions associated with selected tool

7.5 Browse studies

Key	Action
N	Display next study corresponding to study list filter.
B	Display previous study corresponding to study list filter.

7.6 Browsing images

Key	Action
HOME	The first image becomes the active image
END	The last image becomes the active image
←	The previous image becomes the active image
→	The following image becomes the active image
↑	Moving the active image to the preceding line in matrix format
CTRL + ←	Previous page
CTRL + →	Next page
↓	Moving the active image to the following line in matrix format
PAGE UP	Previous workflow step
PAGE DOWN	Next workflow step

7.7 Browsing sequences

Key	Action
X	Display previous marked image
C	Mark current displayed image
V	Display next marked image

7.8 Actions on images

Key	Action
Back space	Removing selected images from viewer
CTRL + D	Duplicating active image
SPACE	Selection / De-selection of active image
CTRL + S	Selection / De-selection of all images
CTRL	Application of the action (for example video invert) to all images
CTRL + A	Goto image
CTRL + SPACE	Auto layout

The mouse operating mode depends on the active mode.

7.9 Selection Mode

Key	Action
	Moving an image: click on the image to be moved and release in the location where it is to be inserted
on the edges of the image	Moving the image (panning)

	Full screen display of the active image / Displaying all images.

7.10 Panning Mode

Key	Action
CTRL + M	Activate Panning mode
	Moving the image (panning)
	Centered image

7.11 Windowing mode

Key	Action
CTRL +W	Activate Windowing mode
	Changing the values
SHIFT +	Rapid changing of the values
CTRL +	Adjusting the window splitting using a ROI (region of interest)
on the edges of the image	Moving the image (panning)
	Reload default contrast/brightness values

7.12 Zoom Mode

Key	Action
	Changing the zoom value.
on the edges of the image	Moving the image (panning)
	Adjusting the zoom for optimal display of the current image in the window
+ (number pad)	Enlarging current image
- (number pad)	Reducing current image
ENTRER	Adjusting the zoom for optimal display of the current image in the window
1 (number pad)	100% Zoom (1 image pixel = 1 screen pixel)

7.13 Shutter Mode

Key	Action
	Draw a region of interest that define the shutter
CTRL +	Moving the two opposing sides of the diaphragm at the same time
	If no diaphragm has been applied: automatic diaphragm, if not diaphragm RAZ
on the edges of the image	Moving the image (panning)

7.14 Measurements and Annotations Mode

Key	Action
CTRL+Y	Activate Measurements and Annotations Mode
	Displaying the Measurement / Annotation contextual menu and possible selection of associated functions
	Definition and modification of Measurement / Annotation
on an annotation	Position of the cursor on the annotation: - In the centre: moving the annotation - On the ends: modifying or editing a text
SHIFT +	Drawing an annotation on top of an existing annotation
CTRL +	On an angle, moving an angle branch
on the edges of the image	Moving the image (panning)
	Deleting the annotation/measurement
Delete	Deleting the selected annotation or measurement
C + Active angle	Displaying the additional angle value

7.15 Magnifying Glass Mode

Key	Action
CTRL + L	Activate Magnifying glass mode
CTRL + L	Activate Invert Magnifying glass mode
	Displaying the magnifying glass
CTRL +	Incrustation of the magnifying glass
on the edges of the image	Moving the image (panning)

	Displays the contextual menu to configure the magnifying glass

7.16 Scroll Mode

Key	Action
	Scroll images to first image
	Scroll images to last image
on the edges of the image	Moving the image (panning)

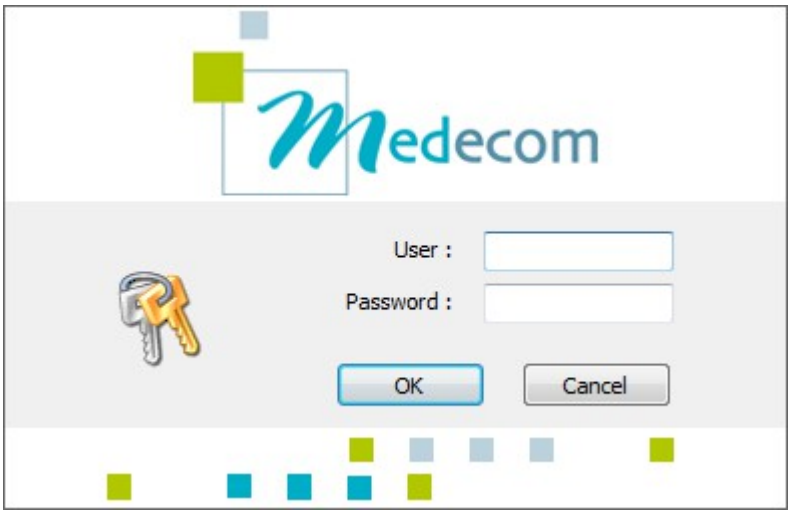
8 Connecting to the station

The station allows user and preference management. The user is authenticated each time the software is started depending on the configuration and if his/her preferences are found. If not all users share the same preferences.

There are three user authentication methods:

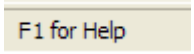
- The station does not authenticate users.
- The station uses the user name and the Windows password to load the user profile.
- The station manages the users and each user has a name and password given by the station's administrator.

The user name is displayed on the status bar when it is known.

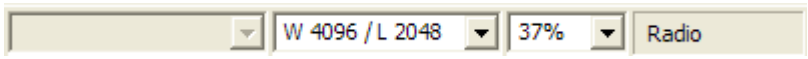


9 The status bar

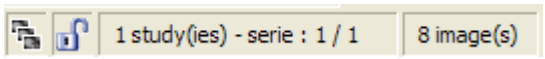
The status bar is located at the bottom of the station's main window.

It contains information, drop down lists and icons. When the cursor moves over one of the station's icons on the examination or image tool bar, the status bar displays a message on the left which states the action linked to this icon: 

The other fields on the status bar represent from left to right:



- The list of layout templates.
- The value of the active image window and the list of specific windows.
- The zoom size of the active image display and the list of specific zooms.
- The user name identified on the station if authentication is active.

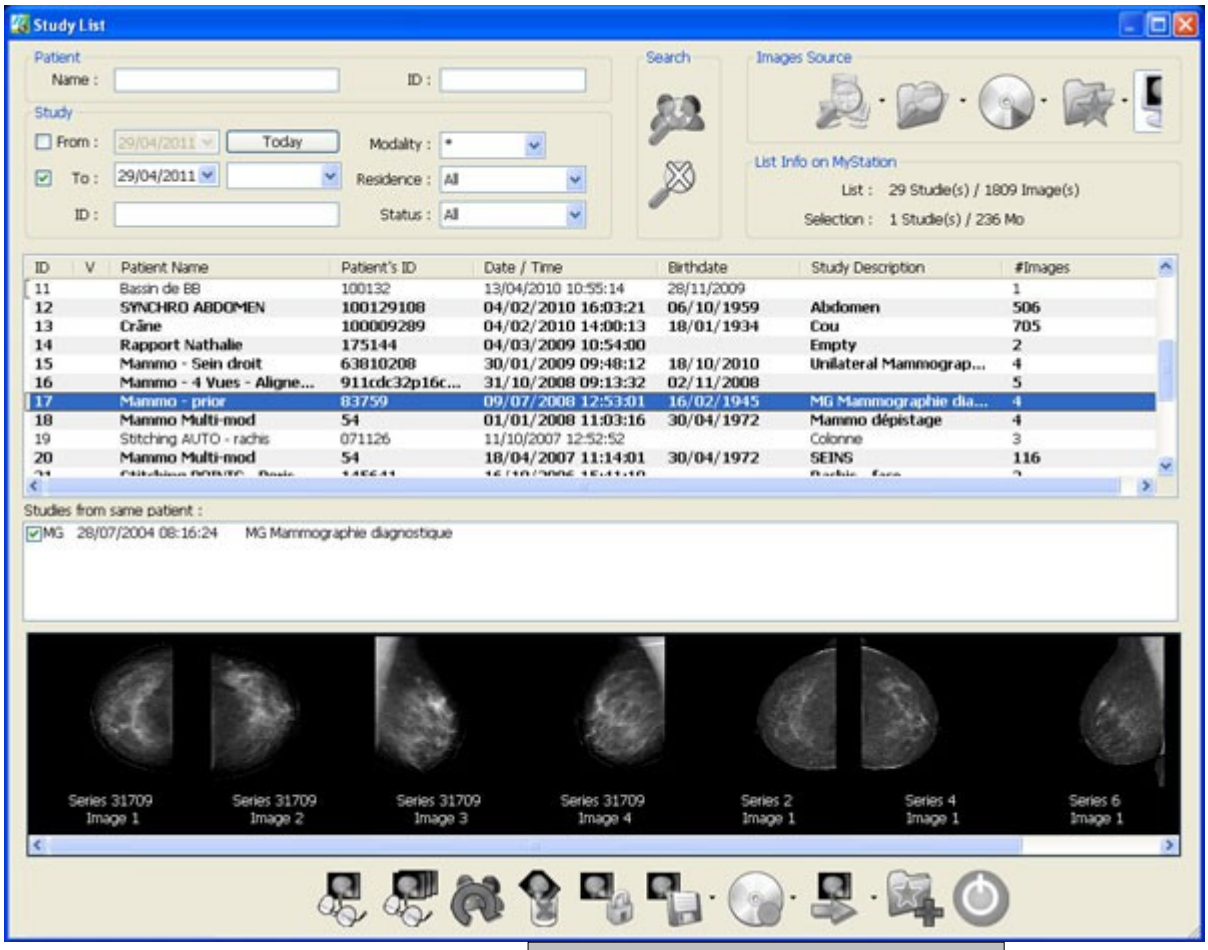


- 'Apply to all images' mode selection [|]
- Locking the active series to prevent it being automatically closed [|].
- The number of open series.
- The number of images in the active series.

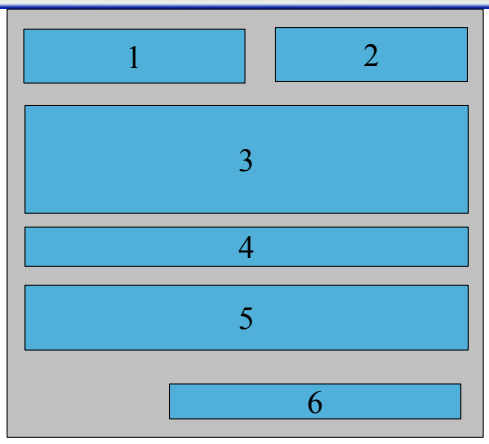
10 Study Window

10.1 Displaying the study window

Click on the icon or press F5 to display the study manager. The following window appears:


Study List
Patient
Name :
ID :
Search
Images Source
Study
From :
29/04/2011
Today
Modality :
To :
29/04/2011
Residence :
All
ID :
Status :
All
List Info on MyStation
List : 29 Study(s) / 1809 Image(s)
Selection : 1 Study(s) / 236 Mo
ID V Patient Name Patient's ID Date / Time Birthdate Study Description #Images
11 Bassin de BB 100132 13/04/2010 10:55:14 28/11/2009 1
12 SYNCHRO ABDOMEN 100129108 04/02/2010 16:03:21 06/10/1959 Abdomen 506
13 Crâne 100009289 04/02/2010 14:00:13 18/01/1934 Cou 705
14 Rapport Nathalie 175144 04/03/2009 10:54:00 Empty 2
15 Mammo - Sein droit 63810208 30/01/2009 09:48:12 18/10/2010 Unilateral Mammograp... 4
16 Mammo - 4 Vues - Aligne... 911cdc32p16c... 31/10/2008 09:13:32 02/11/2008 5
17 Mammo - prior 83759 09/07/2008 12:53:01 16/02/1945 MG Mammographie dia... 4
18 Mammo Multi-mod 54 01/01/2008 11:03:16 30/04/1972 Mammo dépistage 4
19 Stitching AUTO - rachis 071126 11/10/2007 12:52:52 Colonne 3
20 Mammo Multi-mod 54 18/04/2007 11:14:01 30/04/1972 SEINS 116
Studies from same patient :
MG 28/07/2004 08:16:24 MG Mammographie diagnostique
Series 31709 Image 1
Series 31709 Image 2
Series 31709 Image 3
Series 31709 Image 4
Series 2 Image 1
Series 4 Image 1
Series 6 Image 1

The study list is divided in 6 zones :



1. Search fields, like patient name, study date...
2. Images sources
3. study list regarding the search result
4. same patient study list
5. Thumbnails list regarding the selection of the 2 previous lists.
6. Toolbar with all the available actions

Warning : Studies are written in **bold** when :

- none image of the study has been opened
- if a new image of the study is received

10.2 Display same patient study

Regarding the configuration the list is visible or not. It displays the same selected patient studies in the local database.
To open a study from the same patient, check the box of the study. Check boxes can be automatically checked regarding the configuration.

10.3 Searching for and selecting images

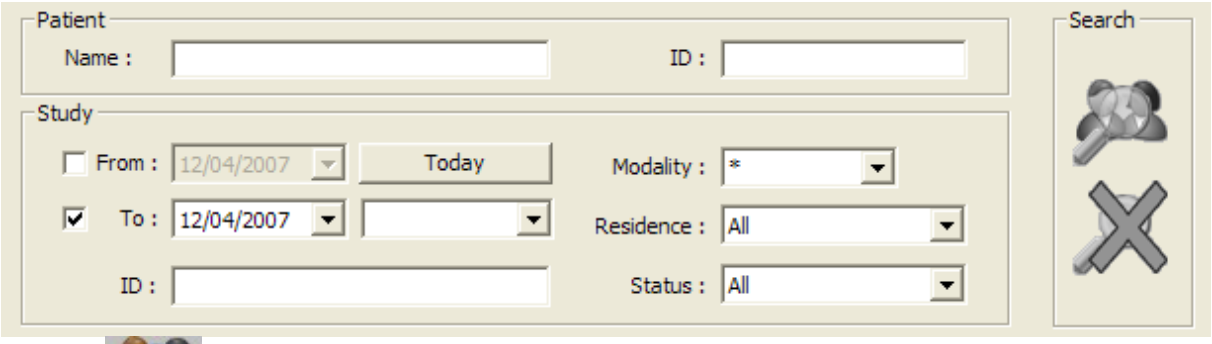
10.3.1 Selecting image sources

It is possible to display images from several sources or locations. There are four different image sources for DICOM images:

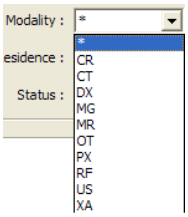
- in the local or remote data base (default function to be used).
- on servers DICOM QUERY/RETRIEVE
- in directories: external disks, USB keys...,
- on CD-ROM DICOM (obligatory DICOMDIR file)
- in virtual folders

10.3.2 Searching for a study or patient on the list

It is possible to search for a study or patient on the list using the different search criteria.



1. Start the search with Patient and Study criteria.
2. Return all search criteria to zero.

Click on  to modify the modality filter.

Not all of the fields to be filled in to refine the search are active depending on the source of the images.

10.3.3 Selecting images

The study or image selection mode on the list is the same as that used for Windows:

- One left click on the mouse selects a specific study.
- Double click left on two lines by pressing SHIFT to select all lines between these two lines.
- Clicking left on several lines and keeping CTRL pressed down selects several lines.
- Double clicking on an study or a series loads the images in the viewer and closes the dialog box.

10.3.4 Selecting thumbnails

Thumbnails are visible with and sources. They are replaced by generic icons in other sources:

- for
- for

- for

Displaying thumbnails changes depend on the selected study method.

- For scanner studies [CT] or [MR], only the first image in each series is displayed. When the scanner study contains 4 series, there will be 4 images displayed.
- For all other modalities, the list of thumbnails contains all images for the selected study.

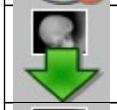
The thumbnails have tooltips to place additional information over the image. The content of these tooltips can be set in the configuration menu.

To select a thumbnail, click on top of it and use the icons to carry out the required action (See below for the meaning of the icons). Double clicking on an image opens the corresponding image in the viewer.
To select several thumbnails, select the first image, then keep the CTRL key pressed down while the rest are selected (thumbnails have not to be contiguous).

10.4 Study Icons Description

The toolbar will change regarding the images source and the configuration.

	Display selected images in separate viewers if there are not from the same study/serie.
	Display selected images in the same viewer if there are not from the same study/serie.
	Update list of studies.
	Remove selected studies from the hard disk and the database.

	Locking the study, preventing it from being deleted.
	Copy (export) selected studies to DICOM format, Anonymous DICOM or JPEG in a selected directory.
	Burning selected studies (option).
	Import selected studies in the database.
	Export selected studies to a DICOM C-STORE server.
	Add to a virtual folder
	Close the study window.

Several actions are accessible directly from the thumbnails:

- Display a selection of thumbnails,
- Remove a selection of thumbnails,
- Copy a selection of thumbnails to a directory,
- Import a selection of thumbnails to a data base,
- Export a selection of thumbnail to a DICOM C-STORE server.

10.5 Retrieving studies from a QUERY / RETRIEVE server

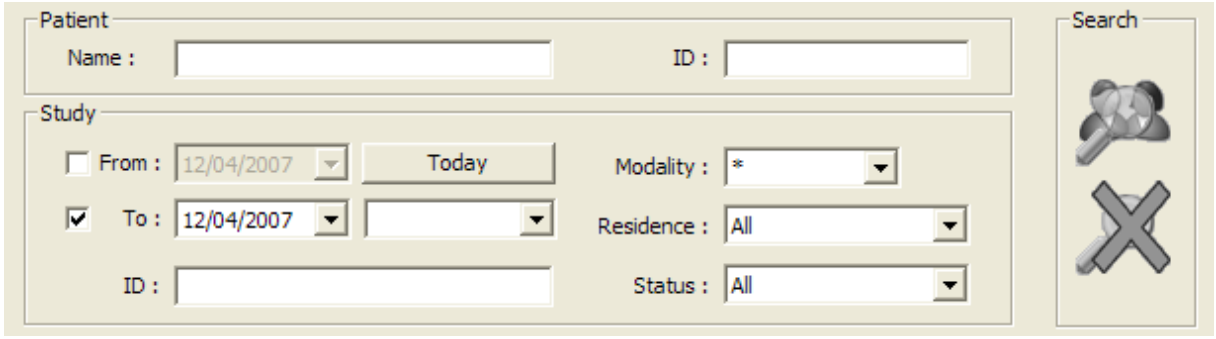
The QUERY/RETRIEVE DICOM (Q/R) function allows a compatible Q/R server to be questioned and to locally retrieve images saved on the server, using the search criteria such as the patient's name. It is recommended that the search criteria are restricted to their maximum as the operation may take some time.

10.5.1 Activating the Q/R mode

- Enter the different search criteria.
- Select the server on which the search is to be made: click right on the small arrow on the Q&R button to display the list of available servers.
- Press on to enter Q/R mode and start the search. "Searching…" is displayed while the server is being questioned.

10.5.2 Searching (QUERY)

- Enter the different search criteria



- Click on
- "Searching…" is displayed while the information is being sought.

10.5.3 Importing studies (RETRIEVE)

Importing studies may be carried out in two different ways, either by double clicking on the list of studies or by pressing on the import button .

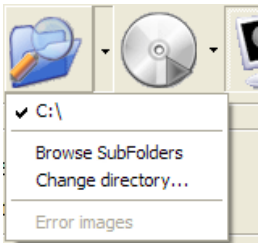
10.6 Searching for DICOM images in a directory and sub-directories

10.6.1 Search

The station searches for and displays information about DICOM images with the [.dcm] file extension.

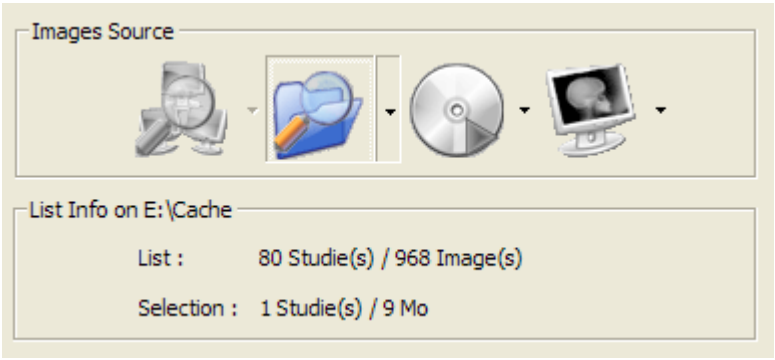
In the image source bar (See 10.3.1), click right on the small arrow on to specify:

- The directory in which the search will be made,
- If the search includes sub-files.



Once the settings have been made, click on to start the search.

Information in the directory (number of images) is displayed once the search has finished and the list of studies is updated. The required actions can then be carried out with these studies, for example displaying or importing them to a data base



10.6.2 Importing images

Select the studies or the images you want to import. Click on to start importing.

The import process run in background. Check the import in the job queue in the

import tab.

Note :

In some case, folders can have limited access rights (for exemple: « My documents »). Import task will succeed only if rights on those folders are changed. To do such modification, use the windows explorer, right click on the target folder, select « sécurity » tab, then add « medecom-postgre » user to the defined user list.

10.7 Reading a DICOM CD

10.7.1 Reading the CD/DVD

This mode allows media (CD - DVD) containing files written by DICOM to be read, i.e. with a DICOMDIR file listing all DICOM images on the media.

If there are several readers, click right on the small arrow on and the reader containing the CD can be selected

.

Click on to start searching the DICOM CD.

Once the search has finished, the number of images found is shown and then the list of studies can be used to carry out the required actions with these studies, for example importing them into a data base.

10.7.2 Importing images

Select the studies or the images you want to import. Click on to start importing.

The import process run in background. Check the import in the job queue in the import tab.

Tip : The CD is locked in the reader, (the reader's EJECT button is deactivated).

10.7.3 Ejecting the CD/DVD

The CD/DVD is locked in the reader. The CD/DVD is ejected by displaying the drop down menu on the CD/DVD reading icon. Click on the Eject menu to open the CD reader:

.

Tip : If the CD does not contain a DICOMDIR file, but has DICOM images with the [.dcm] extension, use the directory path to find out the contents of the CD.

Tip : The disk is automatically ejected if you exit the application while a CD is still locked in the reader.

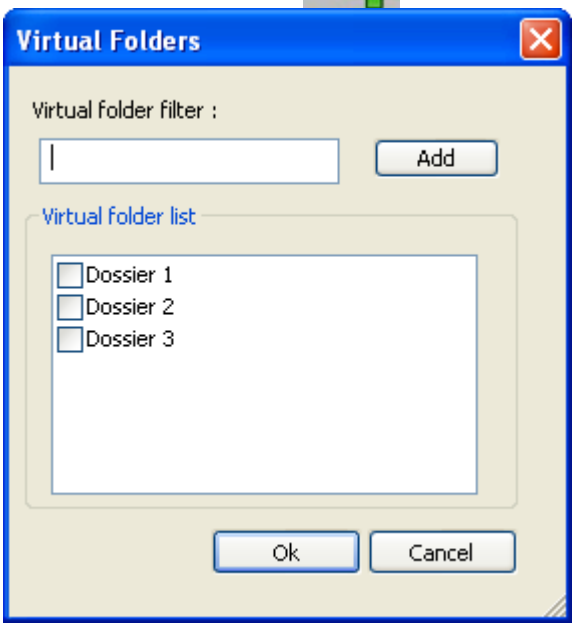
10.8 Virtual folders

Virtual folders are useful to sort the studies regarding your needs. For example you can group your studies by pathology.

10.8.1 From the study list

10.8.1.1 Add a study to a virtual folder

- Select one or more studies from the list
- on the following dialog box opens



- Add the studies by checking the box from one or more virtual folders

Tip : If the virtual folder does not exist, you can create it by typing the name in the text field and click on add

Tip : You can add new virtual folder from the configuration page (see below).

Tip : The virtual folders list will filtered regarding the text field.

Warning : If you've already added a study to a virtual folder and you've made a selection in the study list with this study, already added virtual folder will be displayed (disabled)

10.8.1.2 Displaying a virtual folder

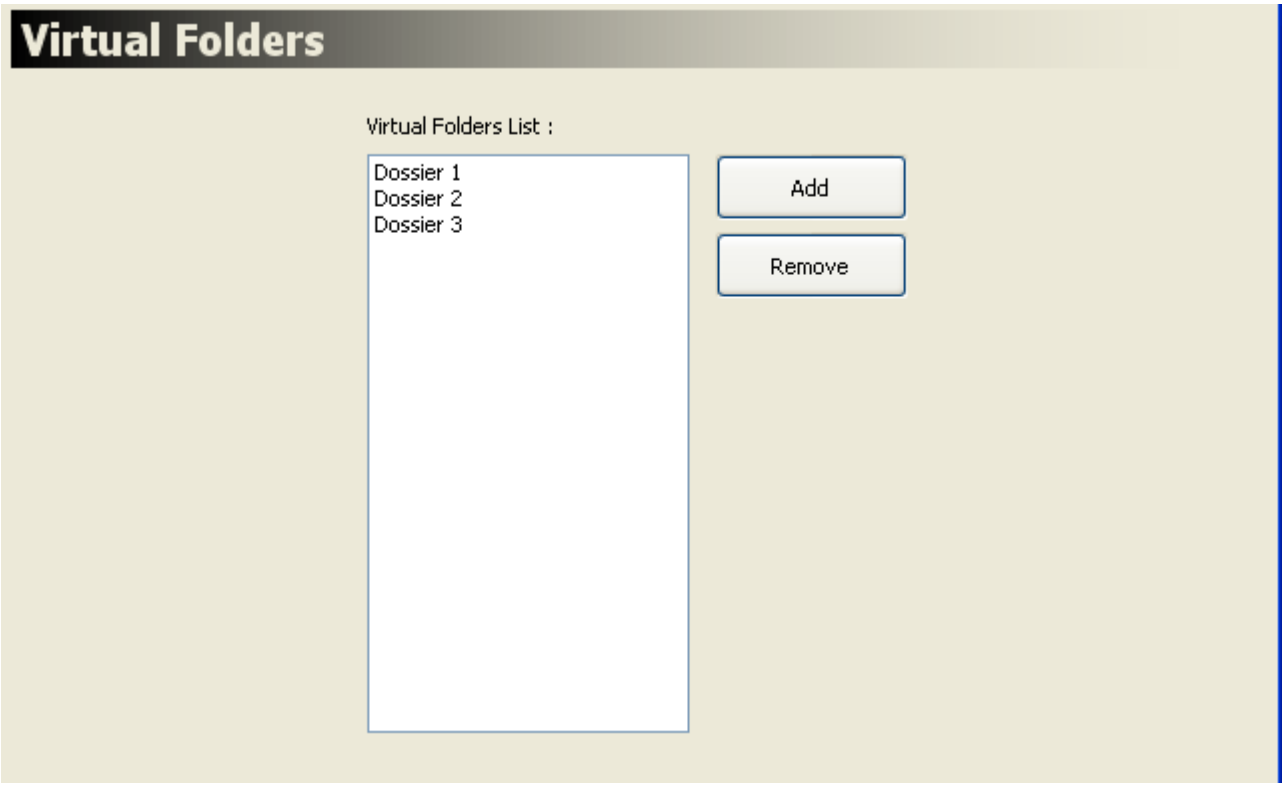
In the images source, on

on the virtual folder from the drop down list.

10.8.2 From the configuration page

You can do some tuning from the virtual folders configuration page. Go the workstation

configuration and select the virtual folder page



10.8.2.1 Add a virtual folder

- On add
- Type in the first line of the study list the new virtual folder.

10.8.2.2 Rename a virtual folder

- Select a folder in the study list
- on the folder to be renamed.
- Press Return to save the modification

10.8.2.3 Delete a virtual folder

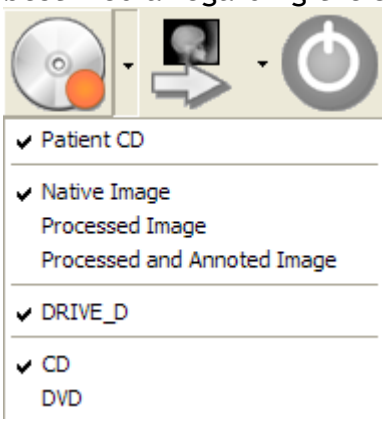
- Select the folder in the study list
- on Remove

Warning : there is no undelete feature !

10.9 Burning a patient CD

The patient CD contains study images in DICOM format. According to the options, it also contains JPEG images and a DICOM viewer to read the images on the CD without the need for additional software on any Windows 2000, 2003 and XP compatible computer. The CD is compatible with the DICOM standard.

Select the studies to be burned on the CD, the burner to burn the studies and the type of media to be used (CD or DVD) or automatic, in this case the software will select the best media regarding the studies size.



Then click on the burn button .

If the image source is a data base (See 10.3.1), the CD may be burned by using several image management modes:

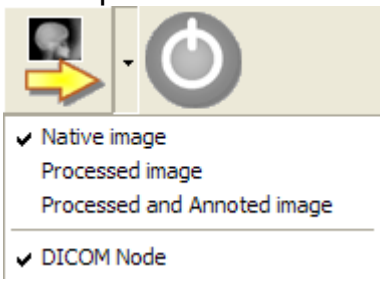
- *Native image*: images will be burned as they have been received.
- *Treated image*: Images will be burned with all their modifications made on the station (contrast/brightness, orientation, diaphragm, filtering …), however annotations are not taken into account.
- *Treated and annotated image:* All actions carried out on the image are applied to the burned image.

Warning: The modifications are final for treated images and treated and annotated images. It is not possible to return to the original image using an image burned onto a CD. For example, it is not possible to delete annotations or cancel a filter.

10.10 Pushing a study to a DICOM station

PUSH mode allows to push selected studies to another station equipped with DICOM C-STORE. The DICOM server configuration is accessible to installation and maintenance technicians.

Select the studies/images to be transferred and the destination station, accessible from the drop down menu on the PUSH button:



Finally, click on the button: it is then sent.

If the image source is the database, images may be pushed using several image management modes:

- *Native image*: Images are pushed as they have been received
- *Processed image*: Images are pushed with all their modifications made on the station (contrast/brightness, orientation, diaphragm, filtering …), however annotations are not taken into account.
- *Processed and annotated image:* All actions carried out on the image are applied to the pushed image. Measures and annotations are burned in image.

Warning: The modifications are final for treated images and treated and annotated images. It is not possible to return to the original image using an image burned onto a CD. For example, it is not possible to delete annotations or cancel a filter.

10.11 Exporting images

When exporting images, the following formats use a lossy compression, which means that an amount of data contained in the pixels is discarded: JPEG, AVI. For grey level images with pixels saved on more than 8 bits per pixel the following formats will also result in a lossy compression: BMP, PNG.

When exporting images, only the DICOM format preserves the meta information (patient identification, study description,...). For all other formats meta information is loss.

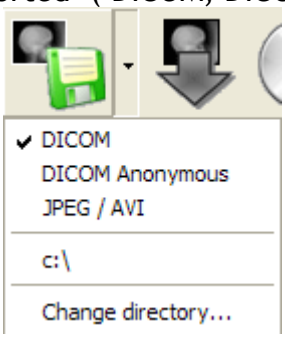
Here are some indications about the compression ratio obtained with JPEG lossy compression, depending on the compression parameters. These results are given as an indication, indeed they highly depend on the encoding of original images (bits per pixel, sample per pixel) and on the content of each image.

	JPEG		
	Facteur de qualité 95	Facteur de qualité 85	Facteur de qualité 75
Compression ratio	12	25	35

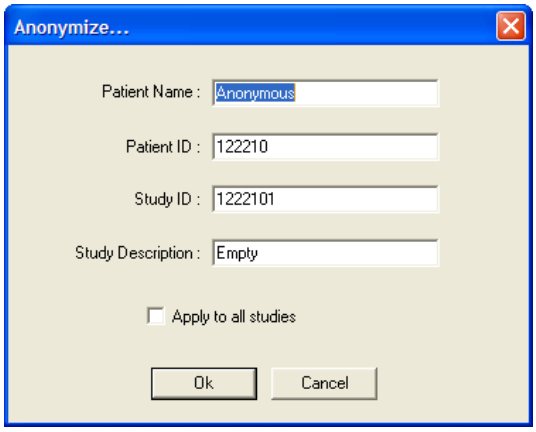
10.11.1 From the list of studies

It is possible to save studies from the list:

- Select the studies, series or the thumbnails directly to be saved.
- Select how they will be exported (DICOM, DICOM Anonymous, JPEG or AVI).

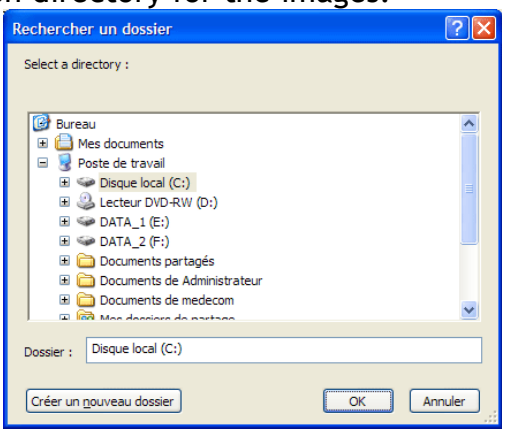


DICOM keeps the same file name as that in the data base. It is an identical copy of the file in the data base.
DICOM Anonymous deletes all demographic information and replace some descriptions using the following dialog box.



JPEG / AVI saving: images saved in this way are compressed into JPEG or AVI format (for sequences), all DICOM information is lost, the JPEG file name takes the patient's name.

- Select the destination directory for the images.

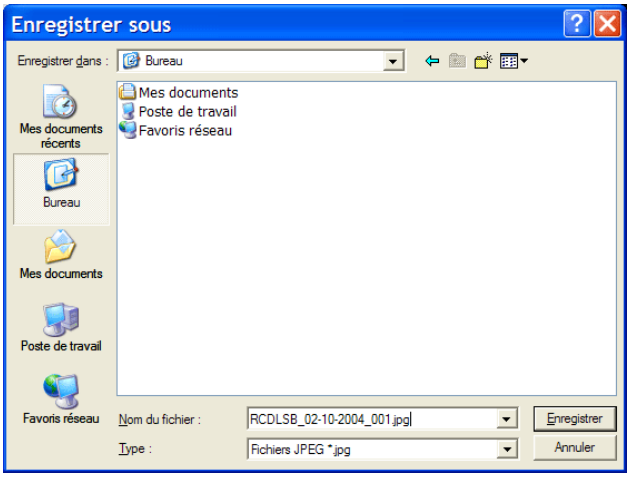


- Click on to save.

10.11.2 From the viewer

10.11.2.1 Saving an open image

- Select the image to be saved
- Go to the "File" menu
- Click "Save in ..."
- The following dialog box opens:

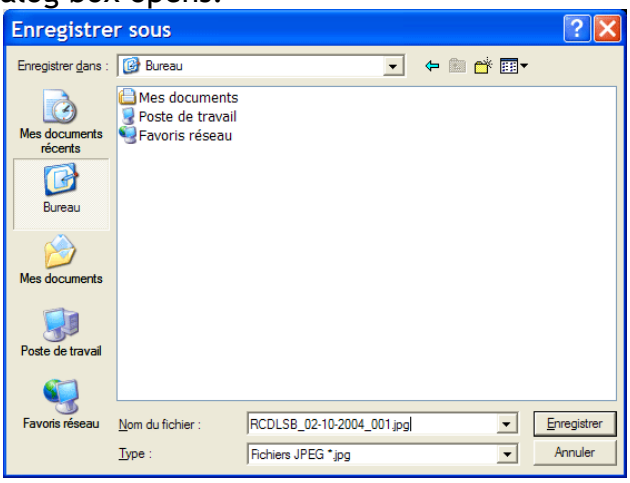


- Select the destination directory
- Select the image format (BMP, PNG, JPEG, TIFF, DICOM, AVI, RAW). AVI format allows a sequence to be saved, for example a cardiac echography sequence.

The station automatically adds the file name extension entered.

10.11.2.2 Saving several open images

- Select the image to be saved
- Go to the “File” menu
- Click "Save in ..."
- The following dialog box opens:



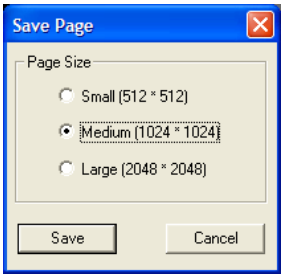
- Select the destination directory, a generic file name is proposed.
- Select the image format (BMP, PNG, JPEG, TIFF, DICOM, AVI, RAW). AVI format allows a sequence to be saved, for example a cardiac echography sequence)
- Click on save. The file names will have the following format: generic_name_XXX.ext. For example, if the generic file name is Edouard_Dupont_03_06_2001, the station creates the following file names: Edouard_Dupont_03_06_2001_001, Edouard_Dupont_03_06_2001_002, etc.

The station automatically adds the file name extension entered, if it is not present.

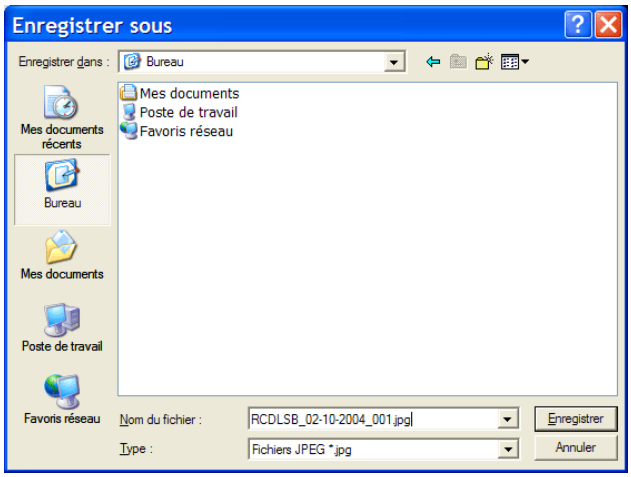
10.11.2.3 Saving displayed images in one file

The station creates a resulting image from the images displayed on the screen:

- Display and format the images. Contrast and brightness settings, the magnifying glass, diaphragm, annotations and measurements will be taken into account.
- Click on « Save the page… » in the File menu:



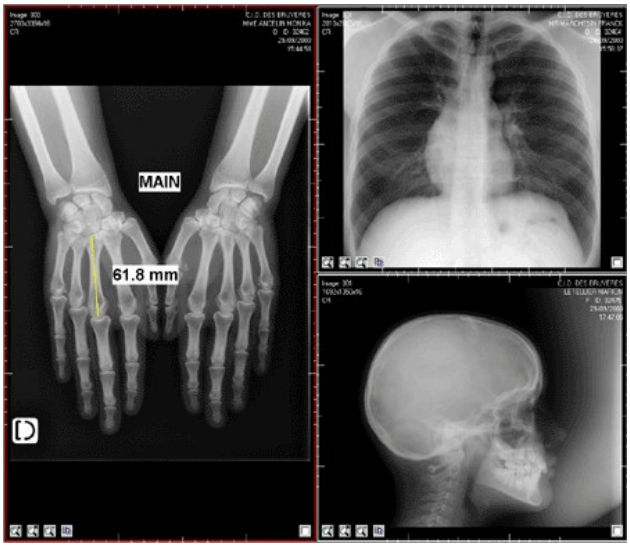
- Select the image resolution for the resulting image and click on Save.
- A dialog box invites the user to enter the file name:



- Modify the default file name, then click on Save.

Below is an example of the resulting image saved with this method:

Presentation on the screen:



Resulting image:

10.12 Configuration

11 Displaying study reports

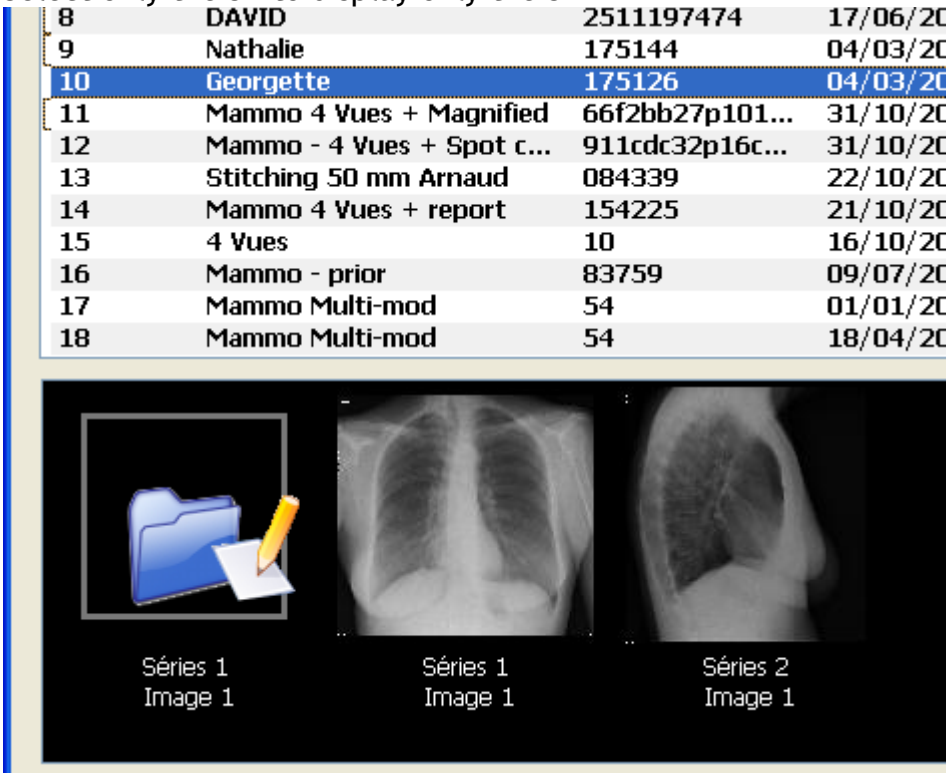
The workstation can display study report DICOM file (SR) and text file

11.1 Display

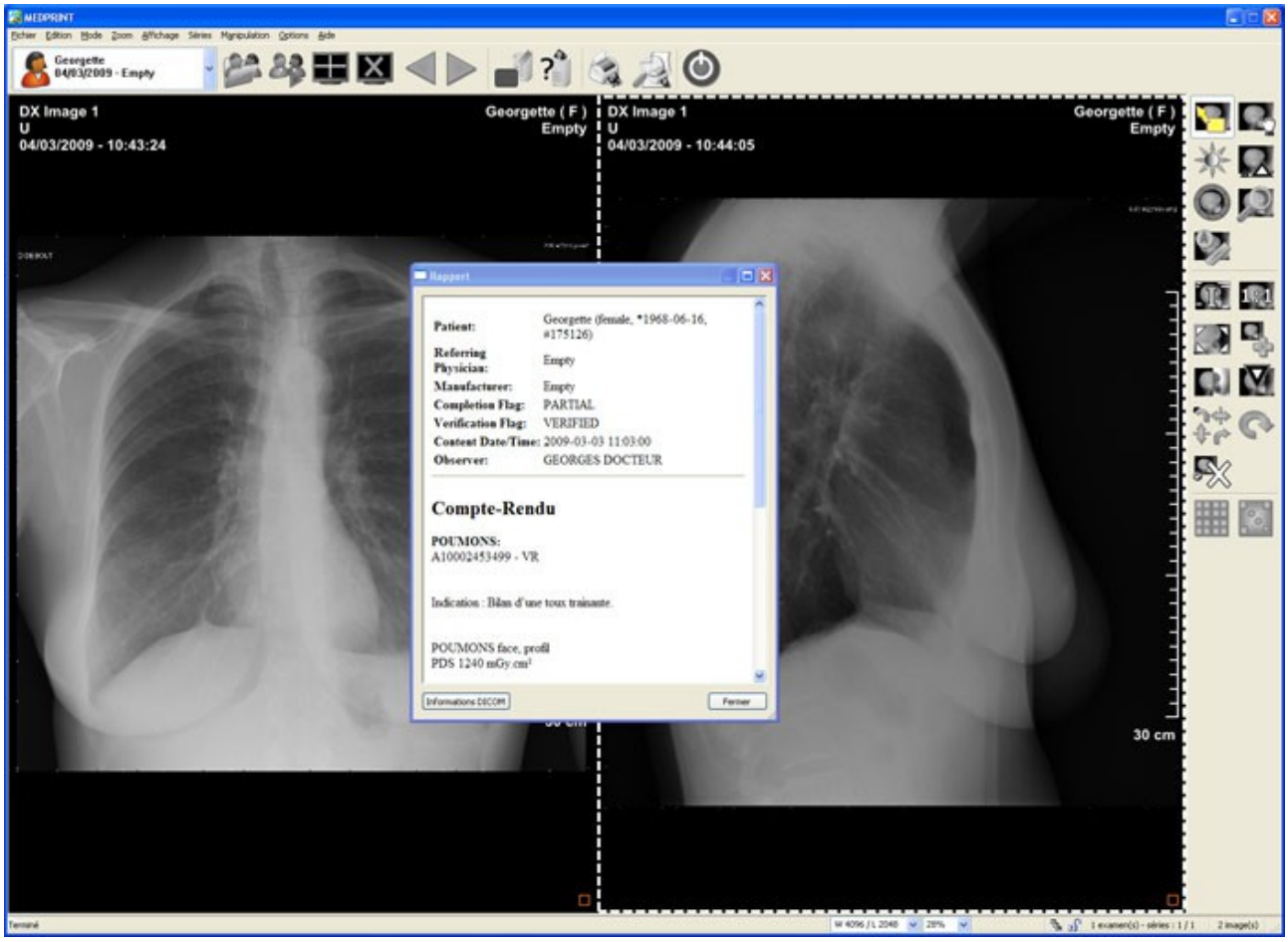
Select in the study list a study that contains a SR

SR are displayed with the following icon :

- Select only the SR to display only the SR

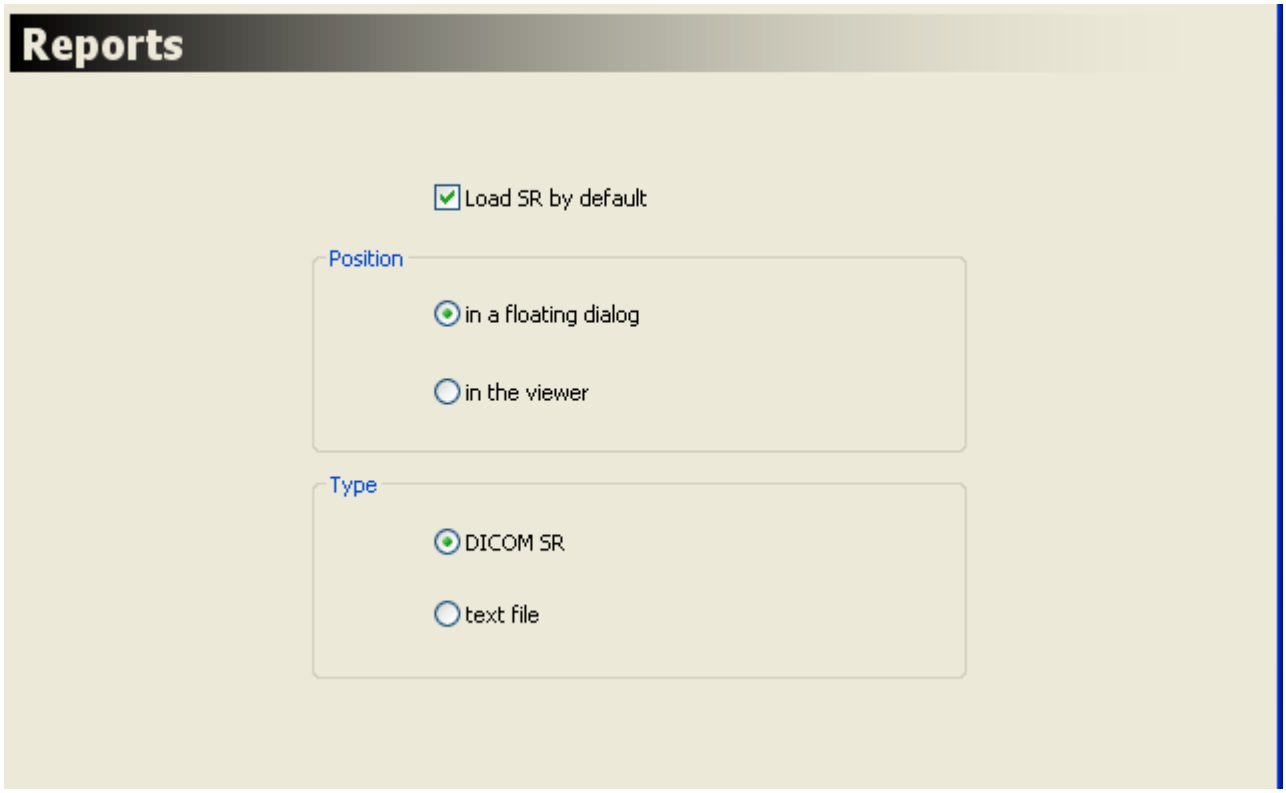

8 DAVID 2511197474 17/06/2C
9 Nathalie 175144 04/03/2C
10 Georgette 175126 04/03/2C
11 Mammo 4 Vues + Magnified 66f2bb27p101... 31/10/2C
12 Mammo - 4 Vues + Spot c... 911cdc32p16c... 31/10/2C
13 Stitching 50 mm Arnaud 084339 22/10/2C
14 Mammo 4 Vues + report 154225 21/10/2C
15 4 Vues 10 16/10/2C
16 Mammo - prior 83759 09/07/2C
17 Mammo Multi-mod 54 01/01/2C
18 Mammo Multi-mod 54 18/04/2C
Séries 1
Image 1
Séries 1
Image 1
Séries 2
Image 1

- Select the whole study to display the images and the report. The report will be displayed using the following configuration.



11.2 Configure

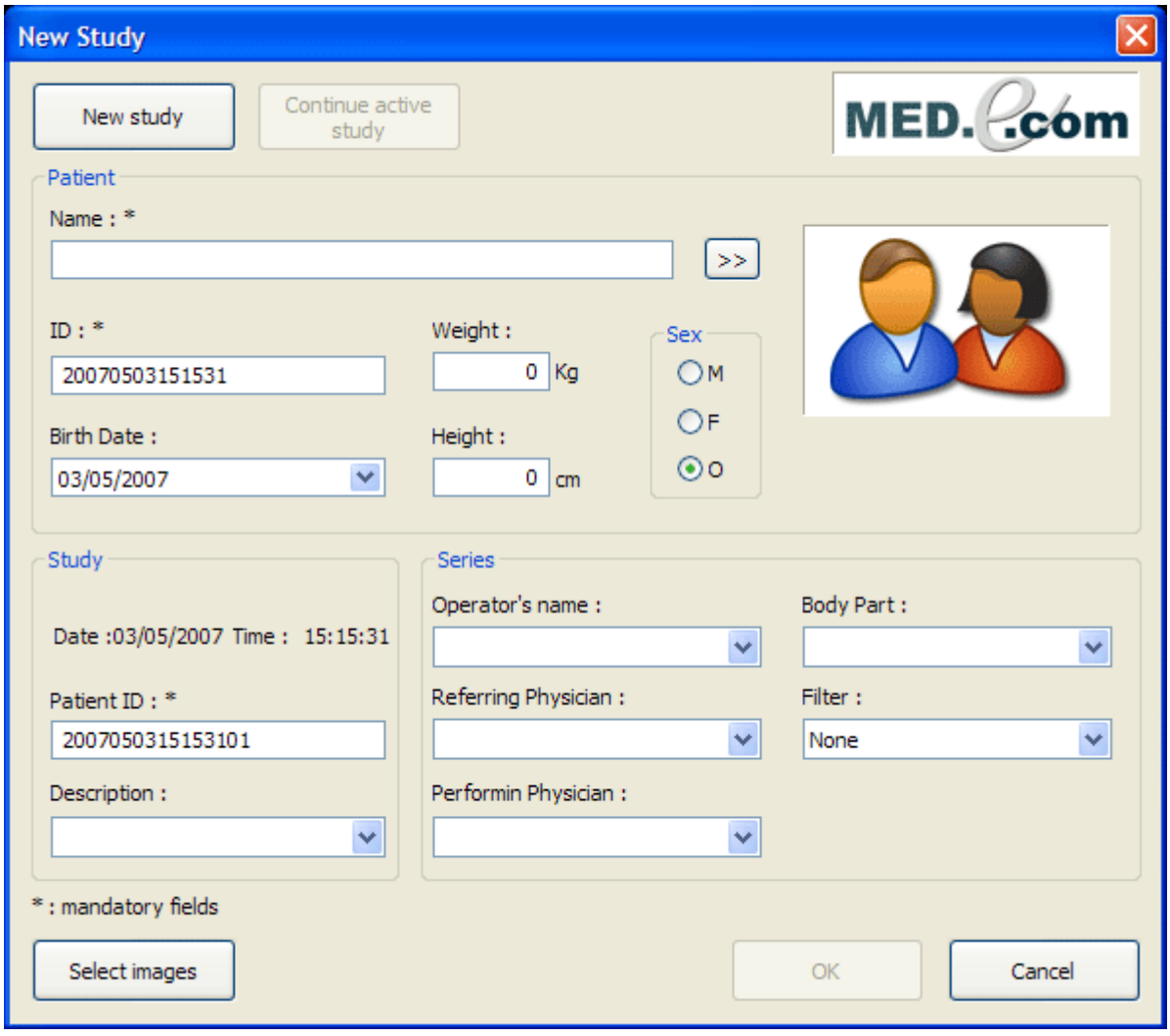
Go to menu Options/Configuration
Select Reports
The following settings can be changed


Reports
Load SR by default
Position
in a floating dialog
in the viewer
Type
DICOM SR
text file

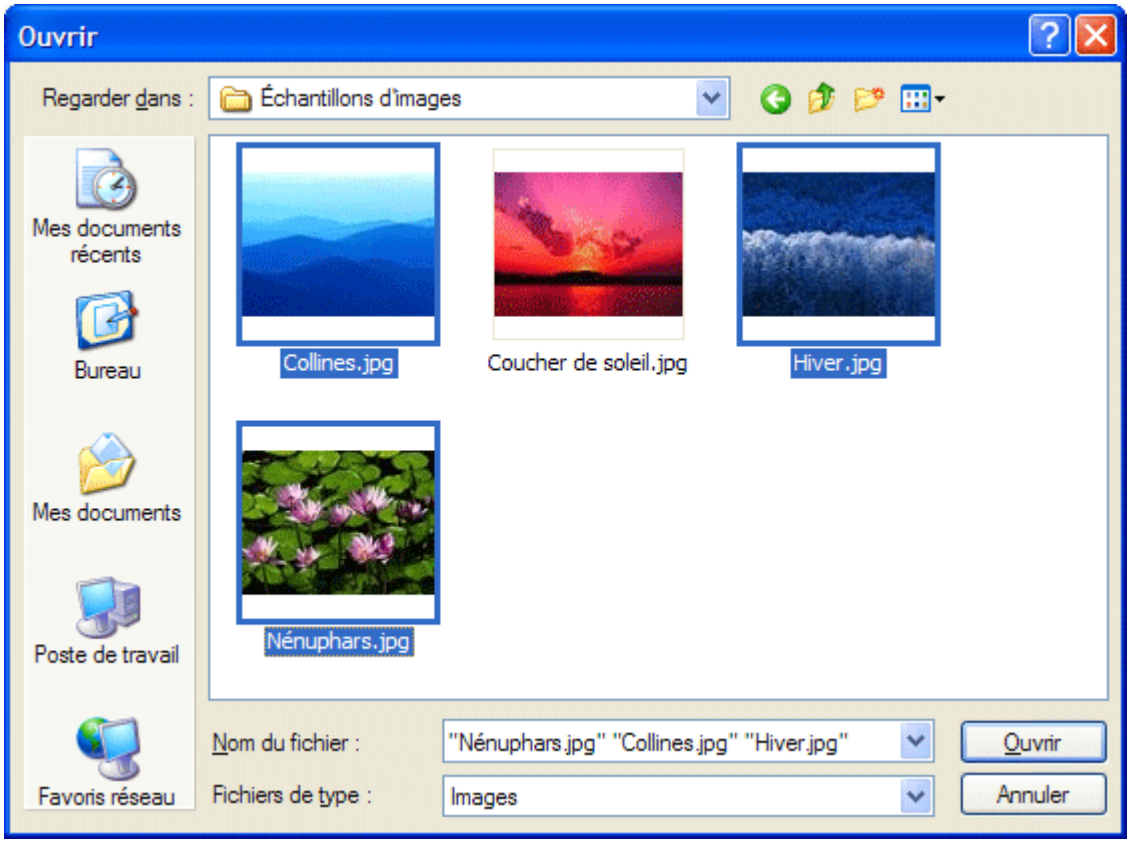
12 Importing images

The workstation is able to convert TIF, JPEG, BMP, GIF images into DICOM files. The conversion in DICOM images allows to add demographic information into the image. Though the DICOM image can be integrated into a PACS system.

- To start importing the images, click on in the serie toolbar. If the button is not available, go to workstation toolbar configuration to add to the serie toolbar. The import dialog box is displayed :



- Fill the fields to add information to your image.
- Click on the Select Images



- Select the images in the directory.
- Click on open when done with the selection.
- Click on OK to start the the import of images
- Imported images are displayed in the viewer and are available in the study list.

13 Defining the active image

The active image is shown by a dotted line frame. The colour is defined in configuration. The active image is the first image when a series is loaded.

The keyboard arrows are used or the image is clicked on to define another image as the active image.

14 Display patient information

Patient information from DICOM files are displayed on each image in diagnosis mode. Three levels are available :

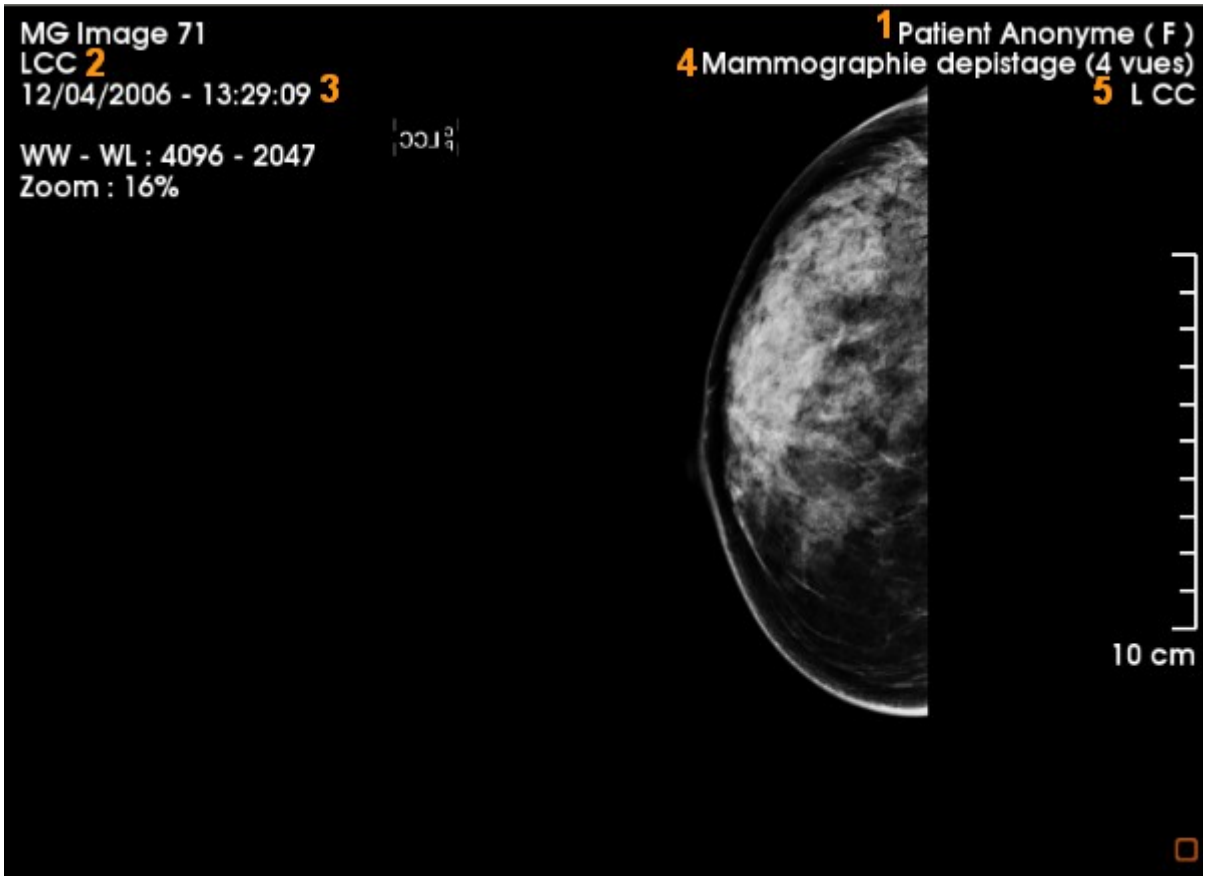
- Empty: no information to display
- Patient : only patient information
- Technical: patient information and technical information

To change the level you can select the following icon : .

14.1 Patient Level

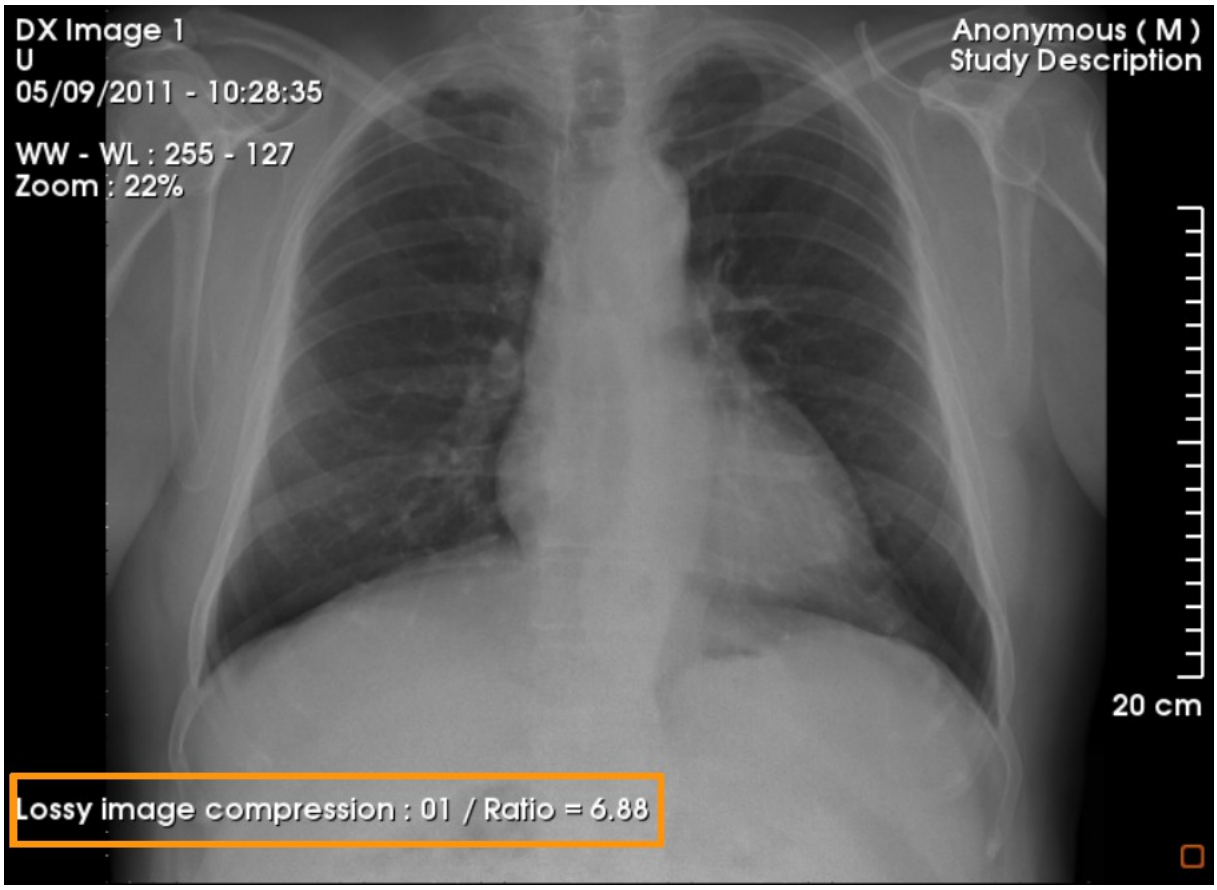
Information needed to identify the patient and the type of study is displayed. The following points must always be checked when interpreting images to avoid mistakes :

- Patient Name - 1.
- Laterality and view code - 2.
- Study date and time - 3.
- Study description - 4.
- Series description – 5.



Default patient information

If the image has been compressed at a point in its lifetime with a lossy algorithm, and if corresponding information is found in the DICOM file, a text 'Lossy image compression : 01' and the corresponding ratio compression is displayed on the image. If the image was not lossy compressed the text 'Lossy image compression : 00' could be displayed.

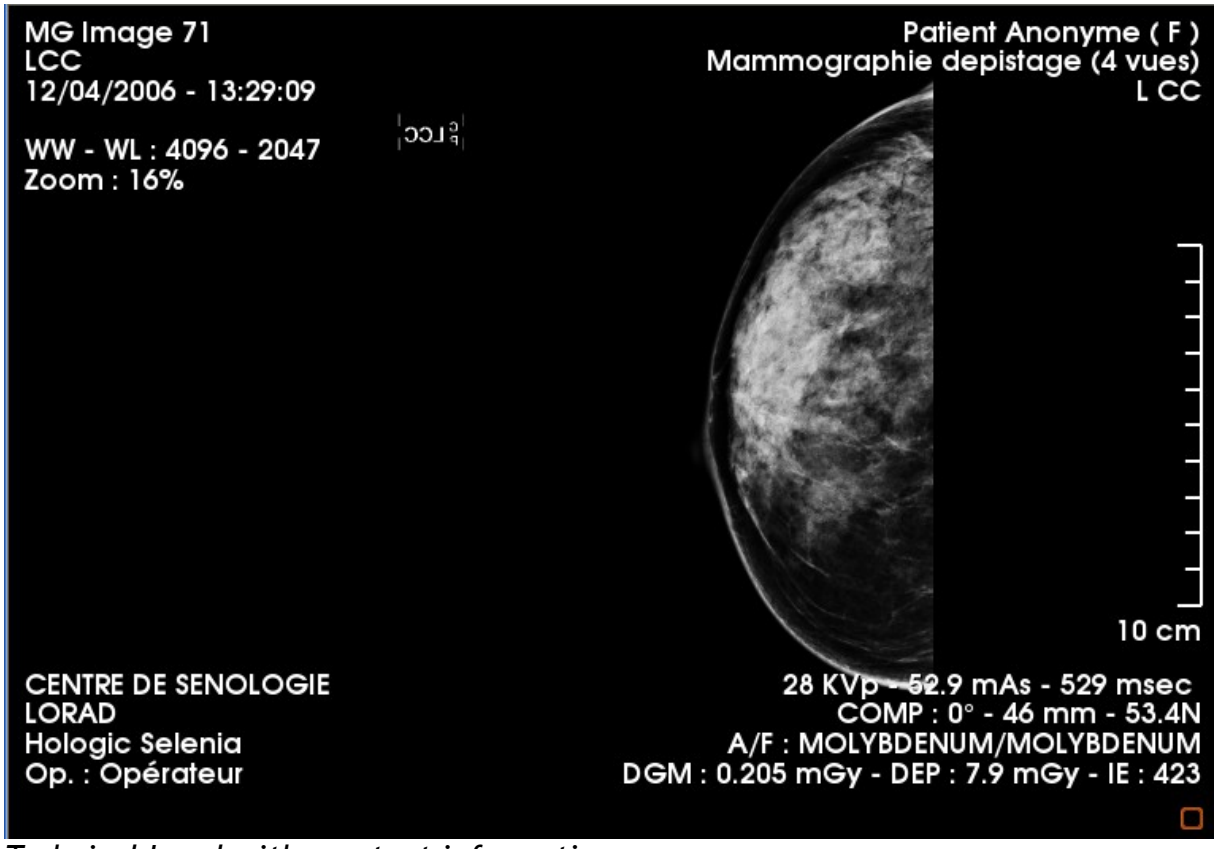


Lossy compressed image

14.2 Technical Level

By default, technical level allows to display if the information exist in DICOM file, some information such as :

- Modality
- Constants used to acquire image
- Calibration used image was acquired (Geometry or Fiduciary).


MG Image 71
LCC
12/04/2006 - 13:29:09
WW - WL : 4096 - 2047
Zoom : 16%
Patient Anonyme (F)
Mammographie depistage (4 vues)
L CC
10 cm
CENTRE DE SENOLOGIE
LORAD
Hologic Selenia
Op. : Opérateur
28 KVp - 52.9 mAs - 529 msec
COMP : 0° - 46 mm - 53.4N
A/F : MOLYBDENUM/MOLYBDENUM
DGM : 0.205 mGy - DEP : 7.9 mGy - IE : 423

Technical Level with constant information.

15 Selecting one or more images

The image selection icon is located in the bottom right of each image:

	The image is not selected
	The image is selected

Images may be selected for:

- Deleting them from the display (they are not deleted from the hard disk),
- Regrouping them,
- Saving them in DICOM or JPEG,
- Carrying out a treatment.

There are two options to select or deselect all images:

- *Edit... Select / Deselect All* Menu,
  - CTRL+ S

There are three solutions if an active image is to be selected or deselected:

- Select in the *Edit... Select / Deselect All* Menu,
- Use the SPACE shortcut key,
- Click on the image selection icon.

16 Changing the layout of the images

16.1 Presentation

The layout of the images in each of the open examinations may be changed. To do so, click on . The "*Drag Drop*" mode is activated.

Click on the image to be moved.
Keep pressed down.
Move the cursor to the required location.
Release , the two images switch places.

This mode also has a 1x1 display by on an image. again to display all images.

Tip: This mode is also used to change the places of the series when a multi-series display is used.

16.2 Example

In mode, click on the image to be moved keeping pressed down. Then move the cursor towards another image.

Release , the two images switch places.

17 Moving inside an image (panning)

Panning allows the image to be moved inside the display window. If, for example, the image is zoomed and only one section of the image is visible, it is still possible to see the rest of the image by panning.

Panning is accessible in two different ways:

- Using Panning mode by clicking on .
- If Panning mode is not selected, by moving the mouse around the edge of the image window, the cursor changes shape (except in diaphragm mode).

In both cases:

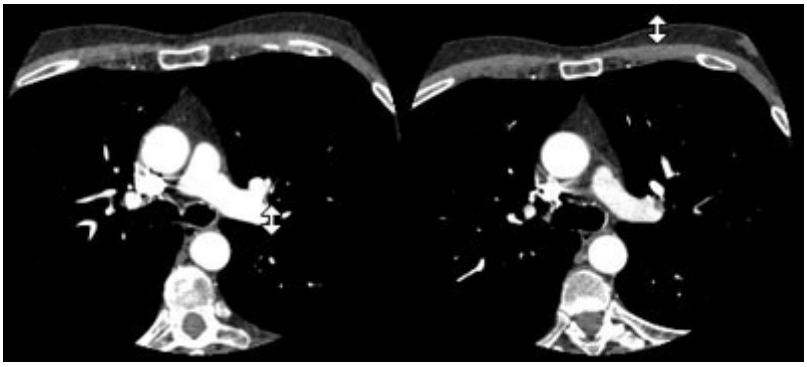
- Click on , keep it pressed down,
- Move the cursor, the image follows the movement of the cursor,
- Release , the image is fixed again.

Tip: In panning mode, allows the image to be repositioned to the default location.

18 Using the stack mode

This mode is used for scanner (CT) or IRM (MR) examinations.

- To activate stack mode, click on ,
- Keep pressed down,
- Move the cursor up or down,
- Release to work on the displayed image.



19 Setting a shutter for an image

19.1 Presentation

To activate shutter mode, click on or select the mode with the contextual menu using .

The shutter may be used to improve the reading of an image on the screen (masking blank areas, displaying one detail only...) or to prepare for printing.

Warning: When a shutter is applied to an image, this is automatically zoomed in the optimal manner.

Tip: The automatic shutter may be used to automatically mask the image's white borders (Check the accuracy of the automatic shutter in the DICOM printing in the options menu).

19.2 Selecting the shape of the shutter

The station has three different shutters shape:

- Rectangular (default diaphragm)
- Circular
- Polygonal

To select the shutter shape, click on to display the contextual menu and select the type of shutter. The blank squares placed around the image are used to change the shutter.

Rectangular	

Circular	
Polygonal	

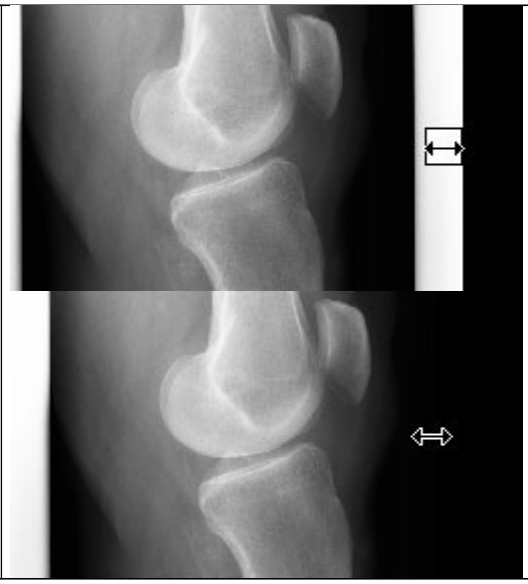
19.3 Modifying the shutter

The shutter may be modified in several different ways:

- By directly drawing the shutter.
- By moving the side of the shutter.

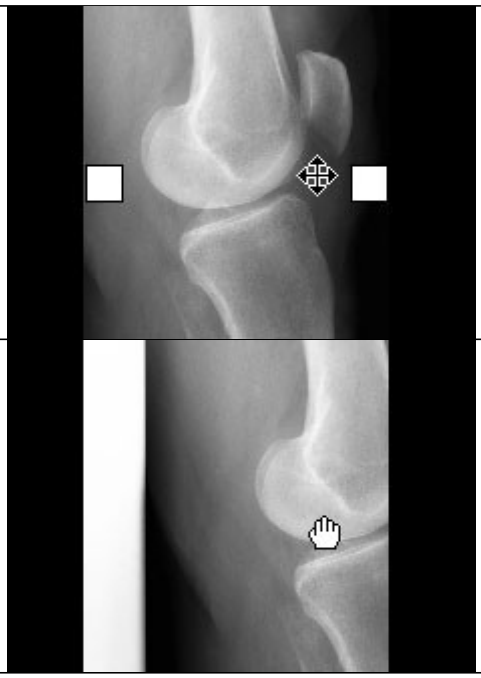
19.3.1 By directly drawing the diaphragm

Click in the area of the shutter and, keeping pressed down, move the cursor to draw the shutter. Release to apply the shutter.	

By moving the shutters: use the “handles” on the shutter (the white squares) to adjust the shutter. **Tip:** The shutters may be symmetrically moved left-right or up-down by keeping the CTRL key pressed own.	

19.4 Moving the image in the diaphragm

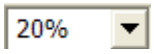
Once the shutter has been applied, the image may be moved within it.

Position the cursor on the rectangular image	
Click on and keep it pressed down while the cursor is being moved	

It is possible to move the cursor vertically or horizontally. Release once the image is correctly positioned in the shutter.	

20 Zooming an image

20.1 Presentation

To activate zoom mode, click on . The zoom value is displayed in the status bar: 

Warning: The zoom only modifies the image display.

Tip: A new zoom may be applied to all images by activating the “Apply to all images” option on the status bar

Tip: For scanner examinations (CT), IRM (MR) and mammography (MG), the “Apply to all images” option is activated as a default.

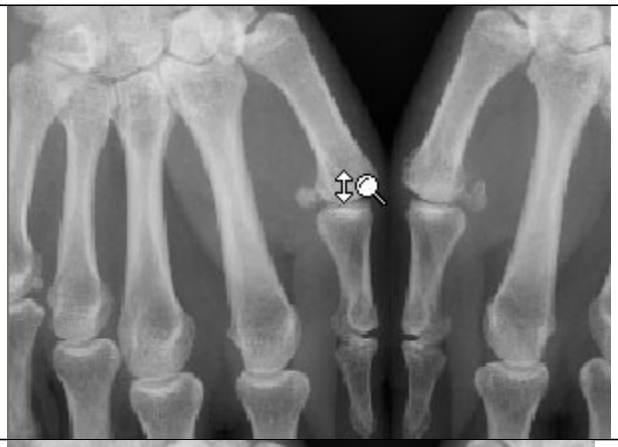
Tip: The number keys may be used to zoom.

Tip: Automatic zoom is possible by clicking

Tip: 1:1 or 100% zoom is possible (1 image pixel = 1 screen pixel) by clicking on

20.2 Zooming with the mouse

Select the image to be zoomed. Click on and keep it pressed down. To zoom forward (enlarge), move the cursor vertically upwards. To zoom backwards (reduce), move the cursor vertically downwards.	

During the zoom action, the image is not recalculated with the interpolation for a time difference. A pixel effect may appear on the image	
Release when the required zoom is achieved. The image is redrawn using the interpolation mode.	

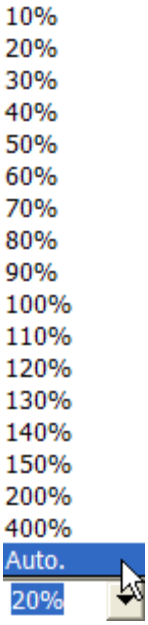
20.3 Zooming with the numeric keypad

To return to automatic zoom , on the image, or press ENTER on the numeric keypad or click on .

- To enlarge the image, use the + key on the numeric keypad
- To reduce the image, press – on the numeric keypad

20.4 Zooming with the status bar

Select the appropriate zoom on the status bar:



21 Using the magnifying glass

21.1 Presentation

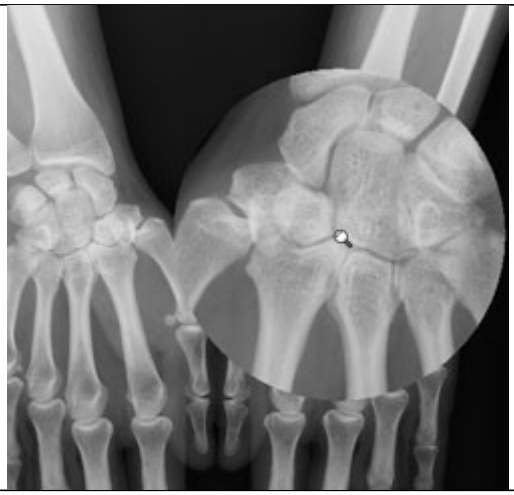
The magnifying glass allows an area of the image to be enlarged. The magnifying glass may be used in two different ways:

3. For a diagnosis directly on the screen
4. For a diagnosis on film, by freezing the magnifying glass.

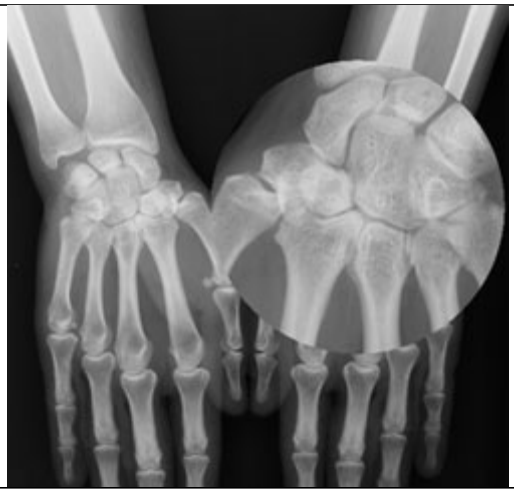
To activate the magnifying glass, click on , the magnifying glass mode is activated, the cursor becomes a magnifying glass.

The magnifying glass mode can also be activated by the contextual menu using .

21.2 Using the magnifying glass

Click on the image, keep the button pressed down, move the cursor to move the magnifying glass over the image. If is released the magnifying glass disappears.	

21.3 Freezing the magnifying glass

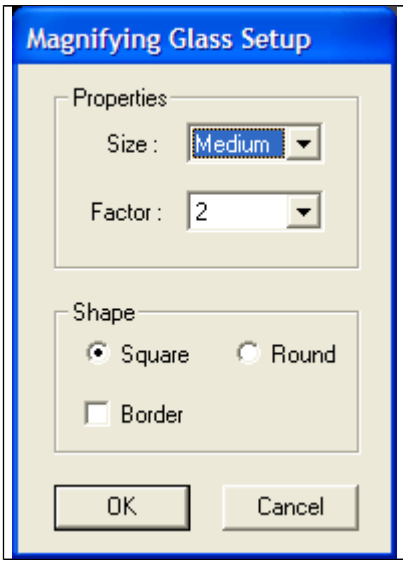
Click on , keep the button pressed down, move the cursor to the region of interest. Press the CTRL key, release , release the CTRL key. The image is printed with the magnifying glass. **NB:** Only one magnifying glass may be set per image.	

21.4 Deleting a frozen magnifying glass

Click on the image, release , the magnifying glass disappears.

21.5 Setting the magnifying glass

To open the dialog box for to configure the magnifying glass, use the contextual menu using , and selecting the "Config the magnifying glass..."menu:



- **Size:** size of the magnifying glass.
- **Factor:** Enlarging the magnifying glass.
- **Type:** Shape of the magnifying glass (round or square)
- **Border:** Displaying a line around the magnifying glass to make it stand out.

It is possible to set the magnifying glass for all images with the Magnifying Glass Options menu or on each image using the contextual menu for the magnifying glass.

Warning: For a mammography image (MG mode), the enlargement factor is not always taken into account :

- If the image is reduced (i.e. if the display zoom is below 100%), the magnifying glass displays the non reduced image (100% zoom) and the enlargement factor is automatically calculated.
- If not (i.e. if the display zoom is equal to or above 100%), the magnifying glass displays the image with the enlargement factor specified in the dialog box.

22 Setting the image window

22.1 Presentation

Setting the image window means the modification of its contrast and brightness. This action is very important in the medical field because it highlights certain structures and areas in the image. The software provides simple and powerful tools.

Tip: It is possible to define each of the window setting modes. To add optional menus to windows consulted.

Tip: To activate rapid window setting, press the SHIFT key at the same time as moving the mouse.

Tip: To apply the same window setting to several CR or DX examination images, activate the “Apply to all open images” icon [] on the status bar.

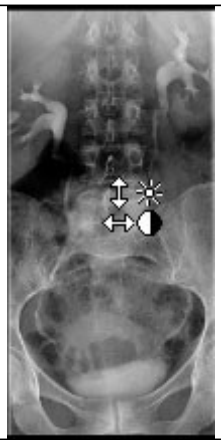
Tip: For scanner examinations (CT), IRM (MR) or mammography (MG) examinations, the new window setting is automatically applied to all images in the series.

To activate the window setting mode for an image, click on or use the contextual menu ( ).

Select the image where the window setting is to be changed.

It is then possible to change the window setting in several different ways.

22.2 Window setting via the mouse...

Click on . Moving the mouse changes: • The brightness on the horizontal axis, • The contrast on the vertical axis.	

22.3 Automatic window setting...

As a default, images are opened with an automatic window setting. To apply the automatic window setting again after having made modifications, on the active image. It is also possible to use the contextual menu.

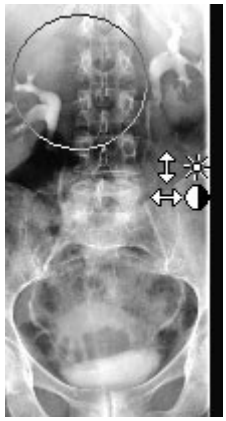
22.4 Window setting for a region of interest...

It is often necessary to adjust the window setting within an area of an image which is of diagnostic interest.

The software allows automatic and rapid adjustment by selecting a region of interest (ROI) in an elliptical shape.

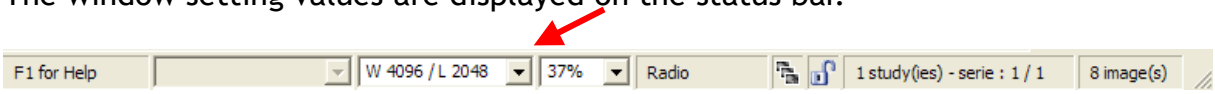
Position the cursor in the centre of the ROI, press CTRL and keep pressed down, click on and move the cursor to adjust the radius of the ROI.

Release and the CTRL key: the software calculates the optimal window setting using the contents of the ROI and displays the image using the new parameters.



22.5 Window setting using the icon bar...

The window setting values are displayed on the status bar.

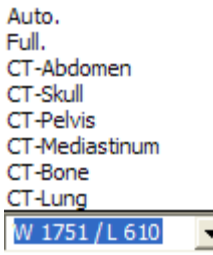


Tip: A specific window setting may also be selected from the list available in the menu.

Click here to add additional windows.

This solution is particularly useful for scanner images (CT). In the Options menu, there is the option of defining and modifying the windows available in this menu.

Automatic window setting automatically adjusts the contrast and brightness depending on the contents of the image as a whole. This is window setting per ROI for the entire image.



23 Displaying DICOM Overlays

Some images contain DICOM Overlays, which are additionnal information to display or hide.

DICOM overlays can be used for example to display annotations such as laterality, or to display CAD result for mammography images.

To display DICOM overlays select the image and click on .

To display DICOM overlays select the image and click on .

24 Processing a video inversion

Select the image to be invert and click on .

Tip: To apply the same action to several images for a CR or DX study, click on [ ] in the status bar.

Tip: For scanner examinations(CT), IRM (MR) or mammography (MG) the geometrical action is automatically applied to all images in the series.
Example...

25 Rotating the images

25.1 Presentation

Rotating Image may allow basic geometrical actions to be carried out on images. To select a geometrical action, click on , keep pressed down for one second, the geometrical action toolbar opens.

	Horizontal mirror
	Vertical mirror
	Rotation 90 degrees to the right
	Rotation 90 degrees to the left
	Cancels all geometrical actions carried out on an image

Select the action to be carried out on the image

Tip: To apply the same action to all images for a CR or DX study, click on [ ] in the status bar.

Tip: For scanner examinations (CT), IRM (MR) or mammography (MG) the geometrical action is automatically applied to all images in the series.

25.2 Examples

Original image			

26 Applying a processing

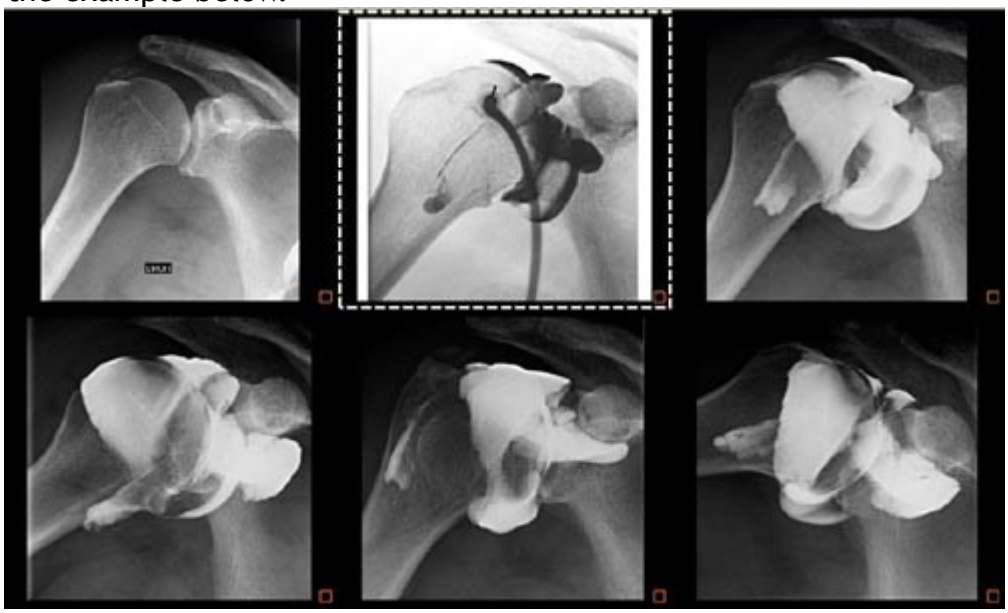
Processings are, for example, windowing, panning, zooming, rotating, video invert, rotating,... Video Invert is selected to illustrate the examples below.

When the “Apply to all open images” icon on the status bar is activated [], the processing is automatically applied to all open images, regardless of the images selected. This icon is activated as a default in CT and MR. If the “Apply to all open images” icon is not activated [], activate it or press the CTRL key to apply a processing to all images in the series.

For example, press CTRL then . All images are video inverted.

When the “Apply to all open images” icon on the status bar has not been activated [], and the CTRL key is not pressed during processing:

- If no image is selected, the processing is only applied to the active image, as in the example below.



- If several images are selected, but if the active image is also selected, the processing is applied to all selected images, as in the example below.

- If several images are selected but if the active image is not selected, the processing is only applied to the active image, as in the example below.

27 Applying a LUT

27.1 Presentation

Applying a LUT on an image modifies the display levels of the image, and thus highlights some tissues compared to others.

To us the LUT, click on the button, a list of the available LUT is displayed.

The brightness and contrast for each LUT may be adjusted in addition to the centre of rotation for the LUT curve.

Click on the required LUT, it is automatically applied. The influence of the LUT on the image can be seen directly.

To cancel the LUT and to return to the default setting, select “Default” at the top of the list. The LUT dialog box may remain open permanently and therefore be available to the user. It is possible to select a new image without having to close the dialog box. To close it, click on the “close” button in the LUT dialog box.

Printing takes the choice of LUT into account.

27.2 Example

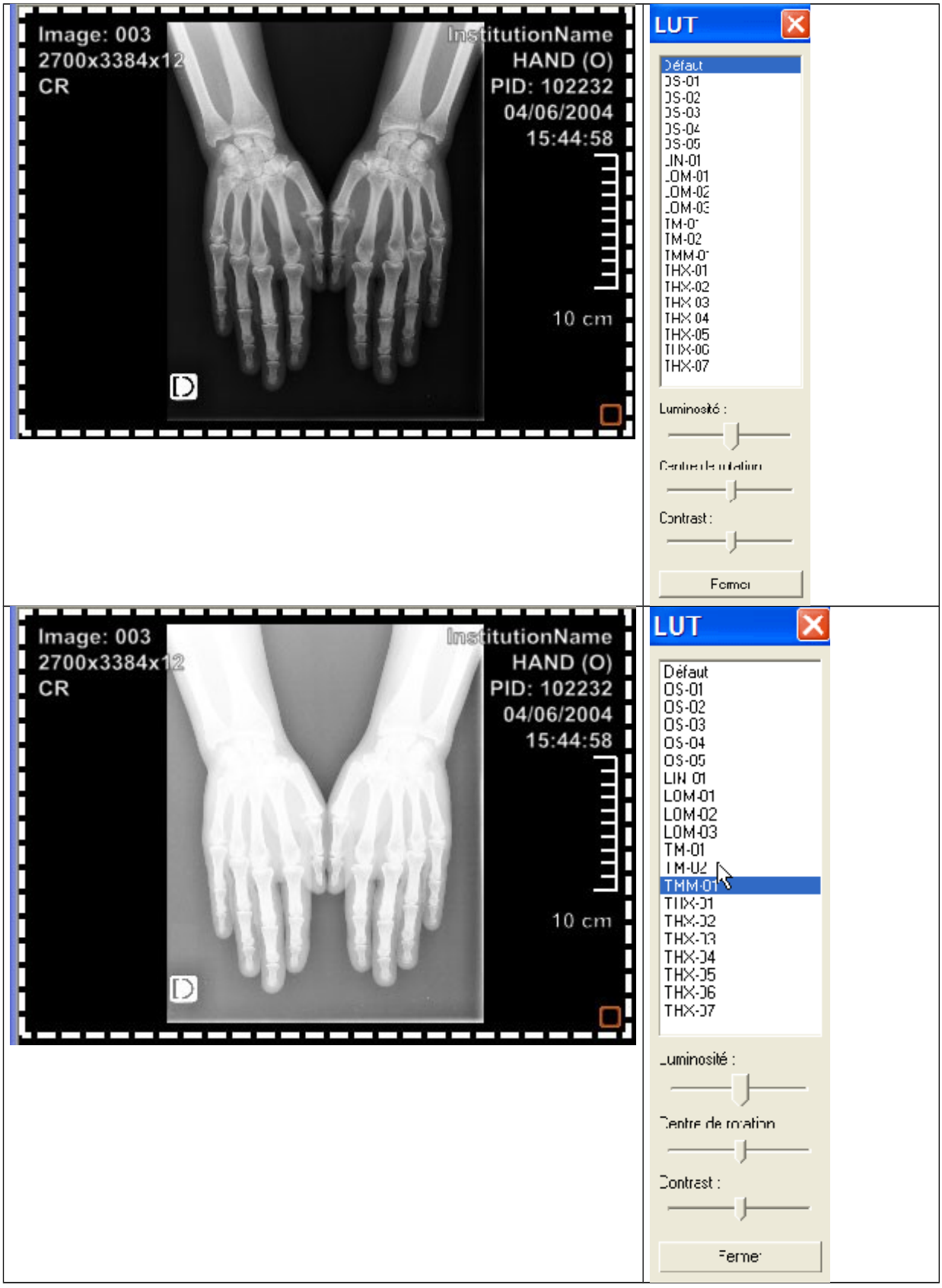


Image: 003
2700x3384x12
CR
InstitutionName
HAND (O)
PID: 102232
04/06/2004
15:44:58
10 cm
LUT
Défaut
OS-01
OS-02
OS-03
OS-04
OS-05
LIN-01
LOM-01
LOM-02
LOM-03
TM-01
TM-02
TMM-01
THX-01
THX-02
THX-03
THX-04
THX-05
THX-06
THX-07
Luminosité :
Contrast :
Fermer
Image: 003
2700x3384x12
CR
InstitutionName
HAND (O)
PID: 102232
04/06/2004
15:44:58
10 cm
LUT
Défaut
OS-01
OS-02
OS-03
OS-04
OS-05
LIN-01
LOM-01
LOM-02
LOM-03
TM-01
TM-02
TMM-01
THX-01
THX-02
THX-03
THX-04
THX-05
THX-06
THX-07
Luminosité :
Contrast :
Fermer

27.3 New LUT creation

New LUT can be created and modified using the processing editor, see Editing processing chapter.

28 Applying a filter to an image

28.1 Presentation

The workstation has 4 filters:

- Filter to improve the dynamics of the image.
- Filter to improve the contrast of the image.
- Filter to improve the details of the image.
- Filter to improve the saturation of the image.

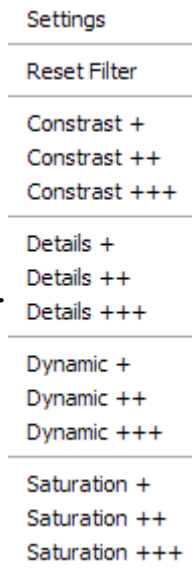
Each filter can be combined with the 3 others. The user can create new filters using Settings in the filter menu (see below).

Tip: After having used the image's dynamic filter, a re-adjustment of the window is often necessary.

Tip: It is possible to apply several filters to one image (one filter for the details and one for the filter for example).

28.2 Applying a filter

- Select the image,
- Click on for to display the filter menu
- Select the type of filter and its intensity.



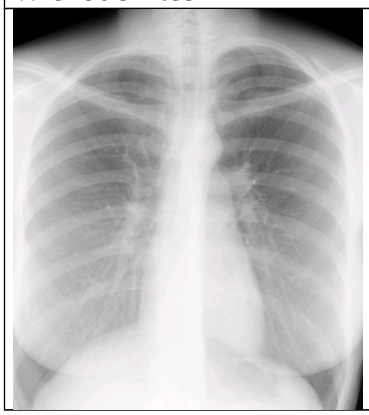
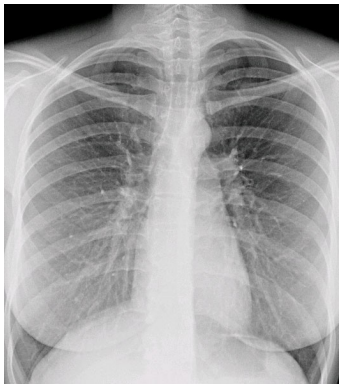
- To cancel a filter processing on an image click on Cancel processing.

28.3 Examples

28.3.1 Using contrast

Without filter	Contrast++

28.3.2 Using dynamic compression

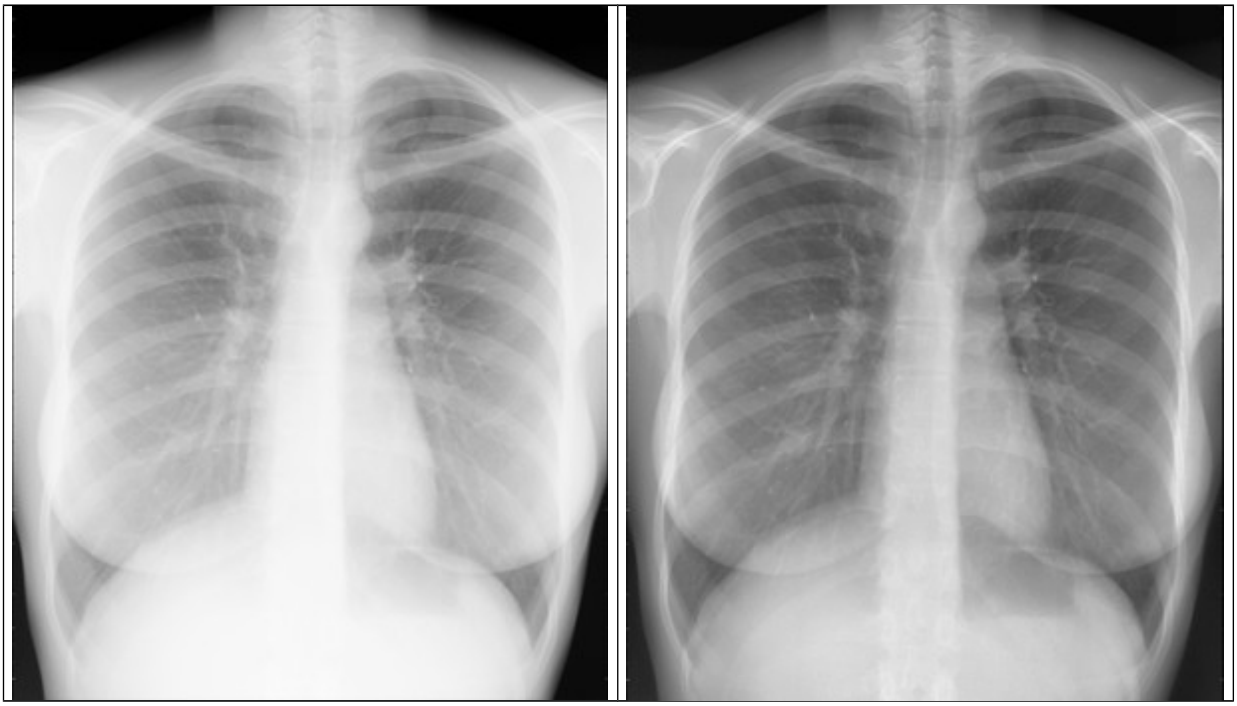
Without filter	Dynamic++
	

28.3.3 Using details

Without filter	Detail++

28.3.4 Using details

Without filter	Saturation++



28.4 Creating new processing

To create and modify processing see the chapter Processing Editor

29 Creating and editing image processings

The processing editor helps with the creation of combine processing between :

- LUT
- windowing
- filters

Processing can be saved for further use.

WARNING : Processing are not burned into the images. Each time an image is opened, if there is a processing attached, the processing is applied, making the loading slower.

WARNING : Processing can be burned in the images when buring on a CD or pushing to another DICOM node if the option is checked (processed image)

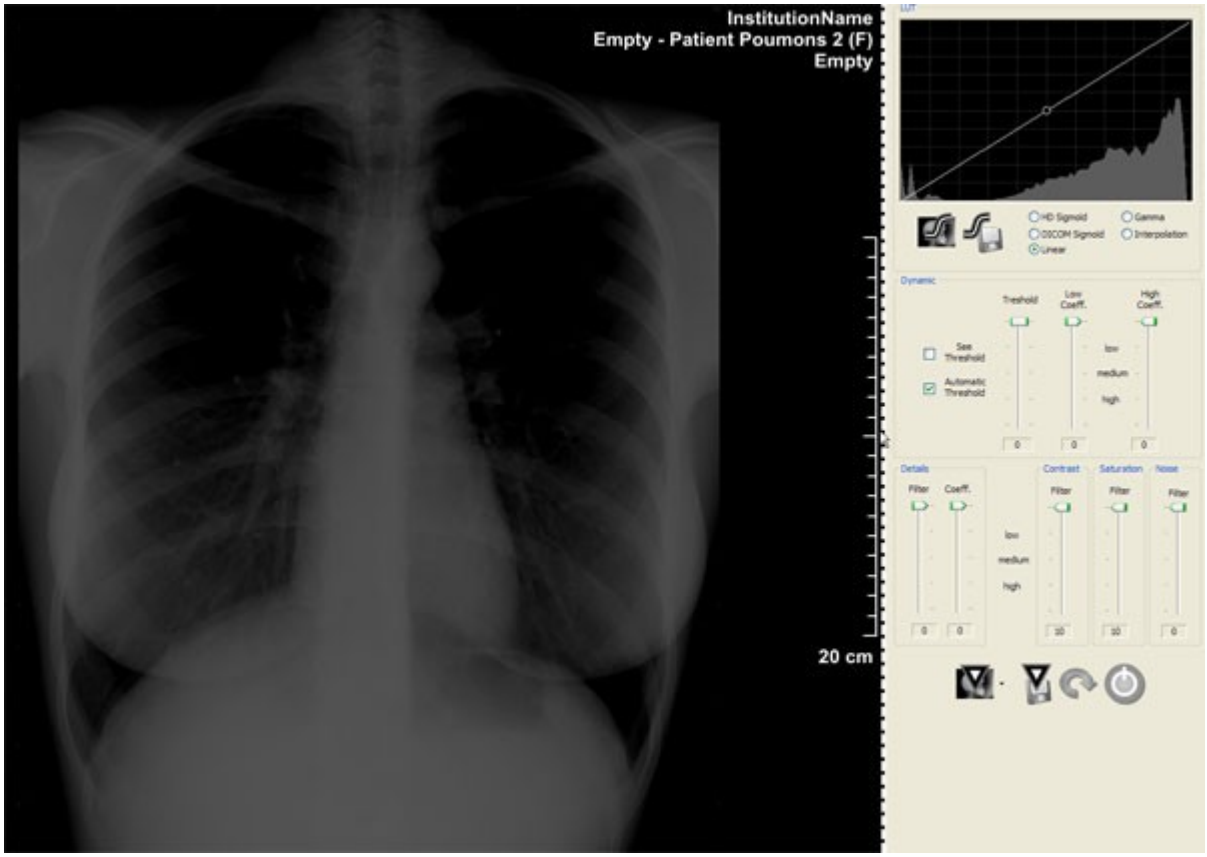
WARNING : LUT are saved in the DICOM image only during acquisition and dicomisation.

WARNING :To combine a LUT with filter, save the LUT first.

29.1 Loading the editor

- Select one image,
- Click on to open the procesing menu, select **Settings**

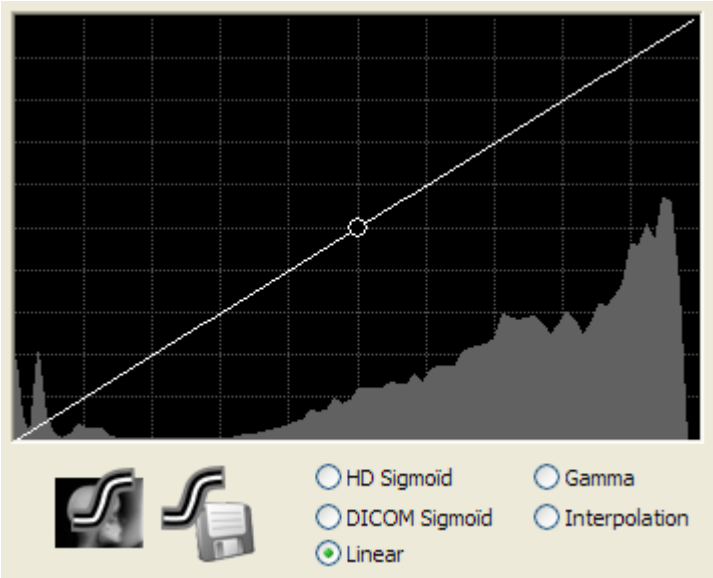
The following dialog box opens :



In the left side, the image to be processed, in the toolbar all the tools for processing.

29.2 LUT Edition

The LUT and the image histogram are displayed in the rectangle.



Click on to open the LUT list. The LUT curve is modified.

The LUT is automatically applied to the left image.

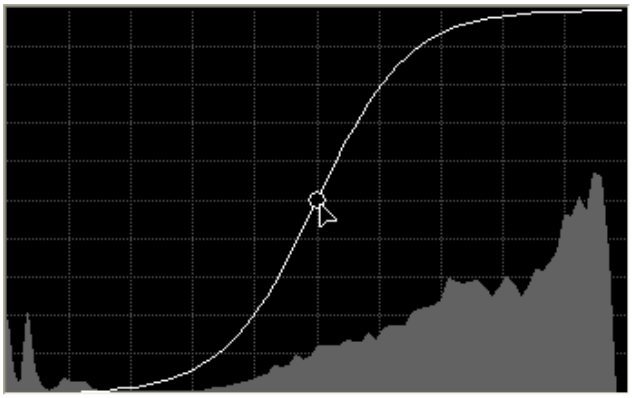
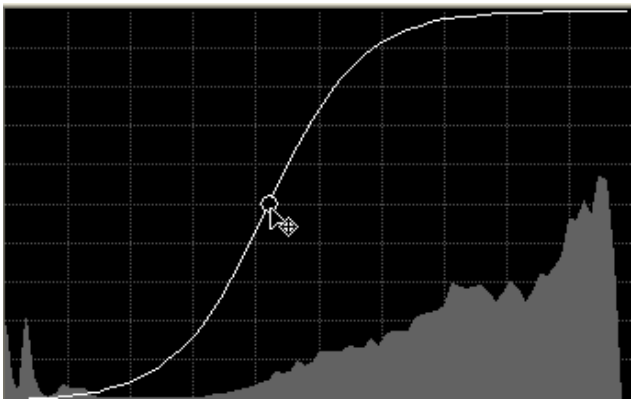
There are 5 different LUT

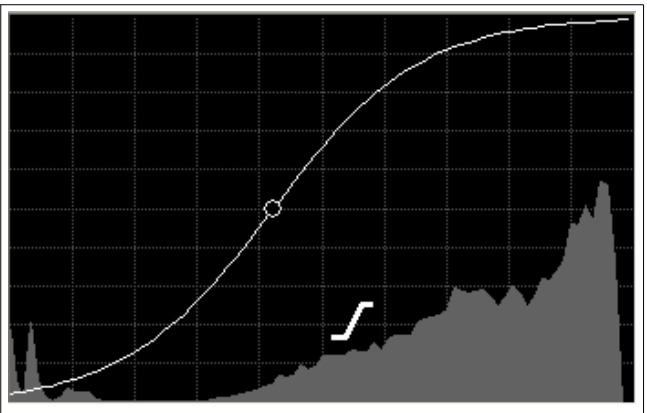
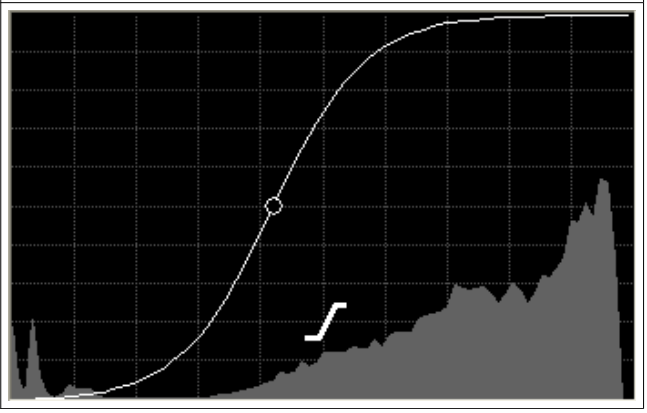
- Sigmoïde HD
- Sigmoïde DICOM
- Linear
- Gamma
- Interpolated

29.2.1 Sigmoïde HD, DICOM and Linear LUT

These 3 LUT are editable the same way. On one of these 3 LUT to select it.

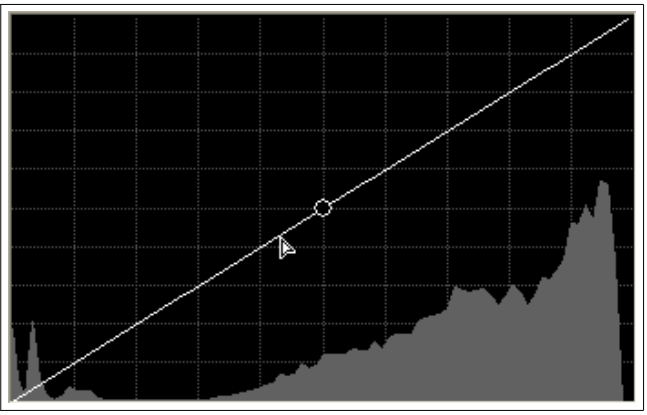
The center and the slope can be modified.

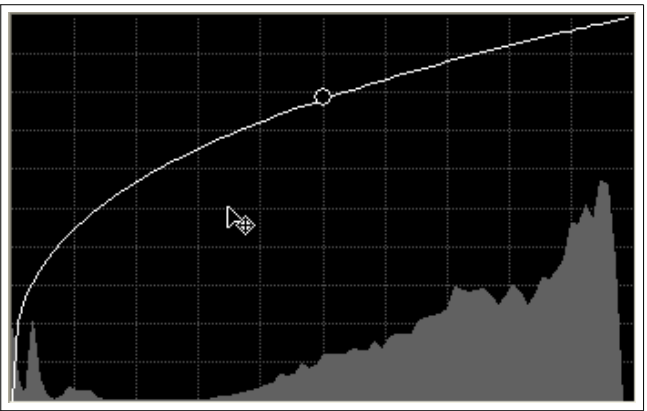
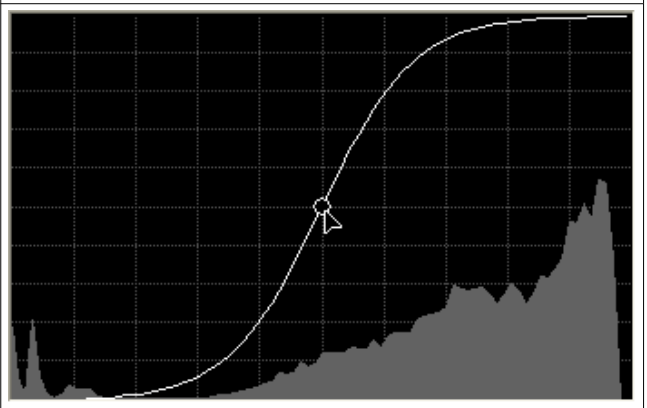
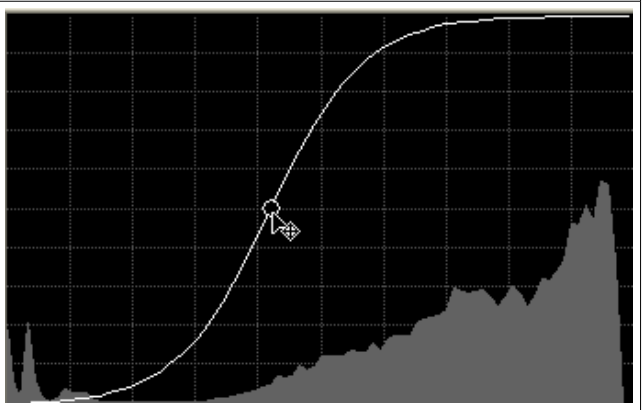
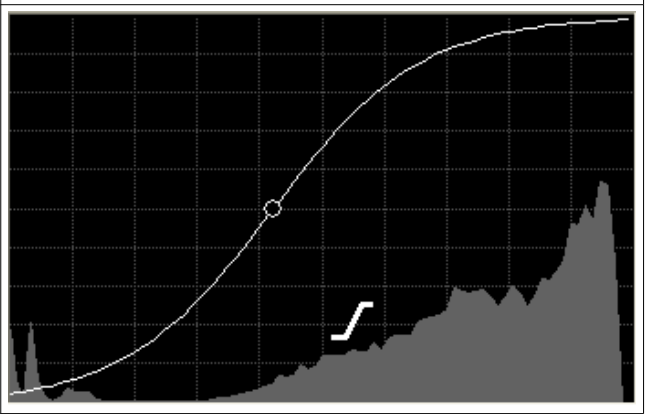
Center Modification Place the mouse on the center of the LUT	
And move the mouse to the left or to the right	

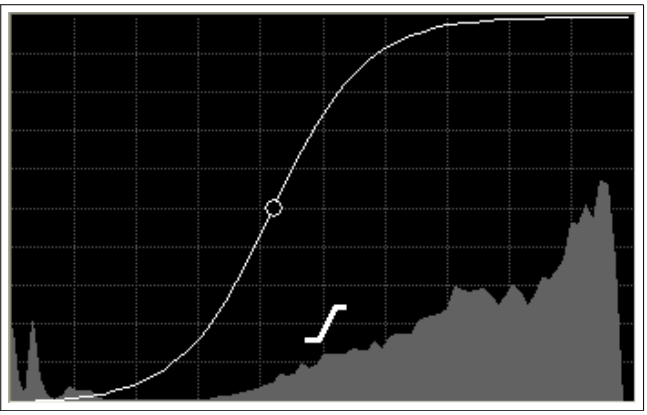
Slope Modification Place the mouse away from the curve	
And move the mouse to the left or to the right	

29.2.2 Gamma

Sur GAMMA to select the GAMMA curve.

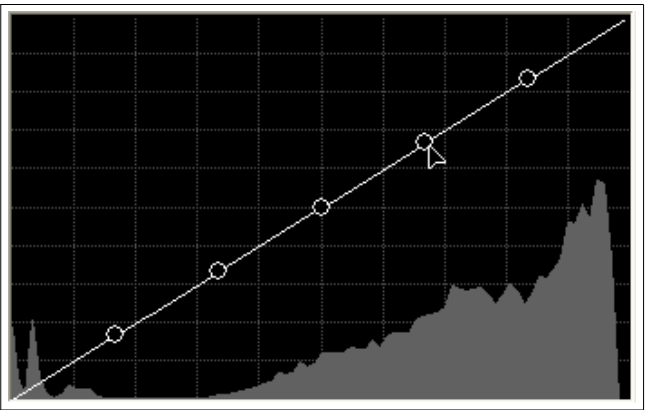
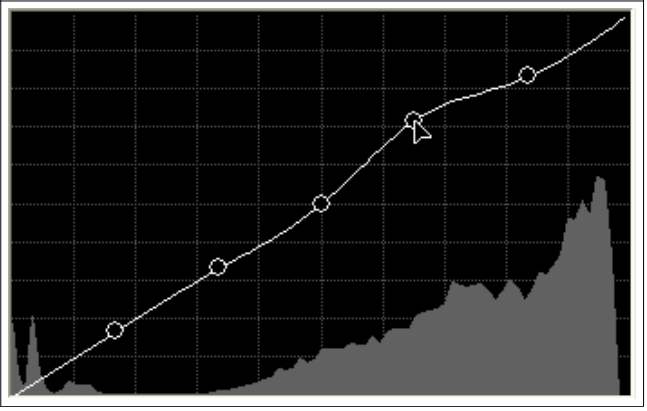
GAMMA curve modification Place the mouse on the curve	

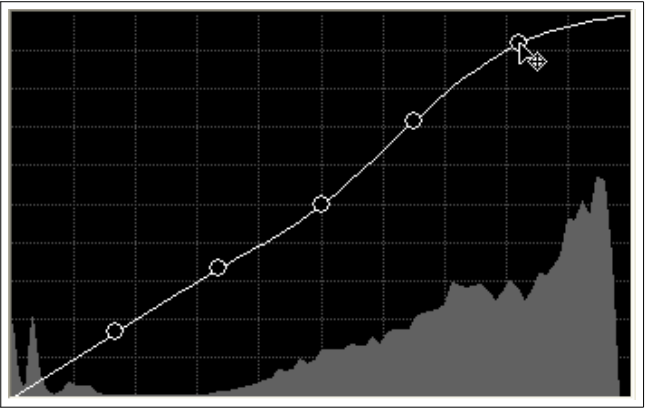
Move the mouse to the top or to the bottom to change the gamma of the image.	
Center Modification Place the mouse on the center of the LUT	
And move the mouse to the left or to the right	
Slope Modification Place the mouse away from the curve	

And move the mouse to the left or to the right	

29.2.3 Interpolation

On interpolated to display the interpolated curve. Each point of the curve is editable.

Move the mouse above a point	
And move the mouse to change the point position.	

Redo the previous action to get the correct curve shape.	

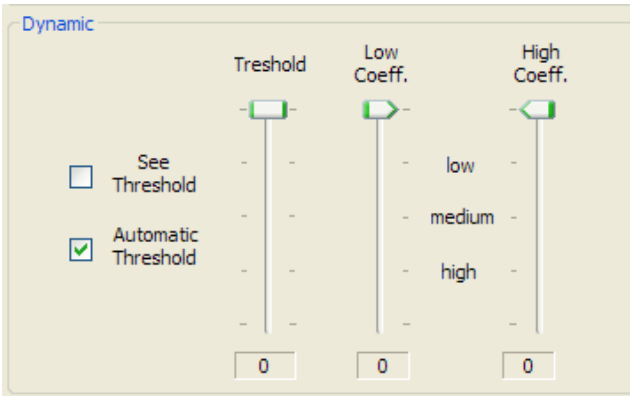
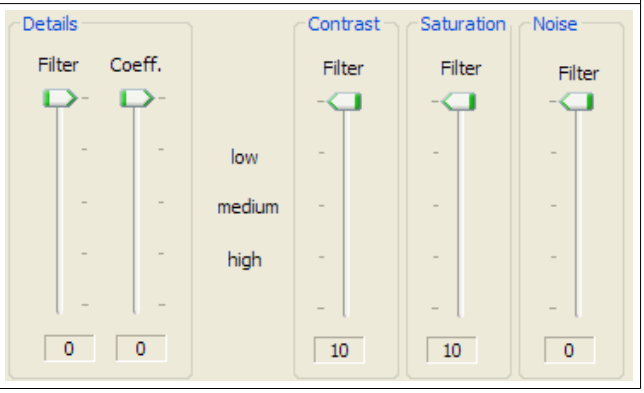
29.2.4 Save the LUT

Click on to save the new LUT.

29.2.5 Edit an old LUT

Click on to select an existing LUT

29.3 Filterer edition

Modify filter settings :	
	

Click on to apply the fitler on theactive image.

29.3.1 Save filter

Click on to save the new filter.

29.3.2 Edit an old filter

Click on menu to select the existing fitler. The settings are loaded.

29.4 Windowing

The windowing is a part of the processing. To change the filter on the image. The windowing will be saved in the processing.

29.5 Cancel a processing

Click on to cancel a processing.

WARNING: The windowing is also cancelled

29.6 Quit the processing editor

Click on to leave the processing editor.

30 Adding a processed image

You can save a new image after doing any processing on an original image.
The new added image will have all the processing and depending on the workstation configuration the measure / annotation burn in.

For adding a new image, click on

30.1 Configuration

30.1.1 Adding the button

If the button is not present in the image toolbar, click in the menu, select Option/Configuration/Toolbar/Image

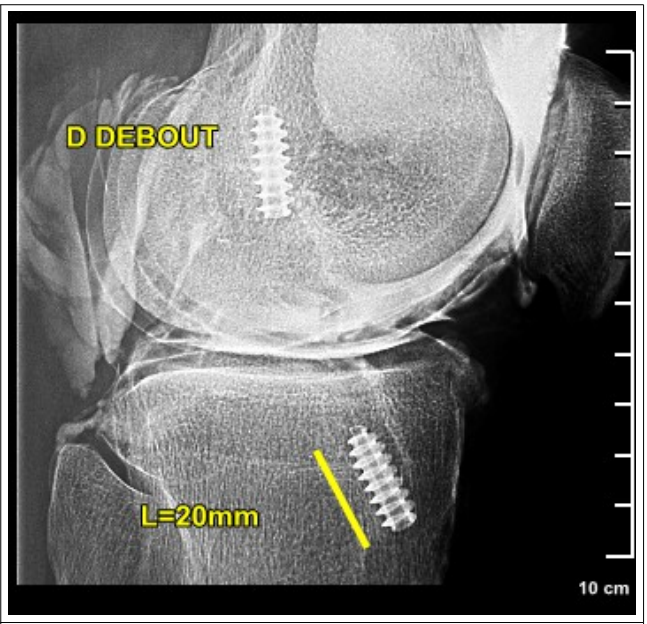
Add the button

30.1.2 Adding measure/annotations burn in

Click on the menu Options/Configuration/Preferences
Click on the box : “When inserting a image, burn...”

30.2 Example

Open one study	
Select one image	

Do manipulations on the image Add some annotations	
Add the new image by clicking on Without option measure/annotation burn in the image	

Add the new image by clicking on With option measure/annotation burn in the image	
Original image restored with default values	

31 Modifying the layout

31.1 Presentation

Image display is carried out as a matrix. The format for opening the series is different depending on the series mode:

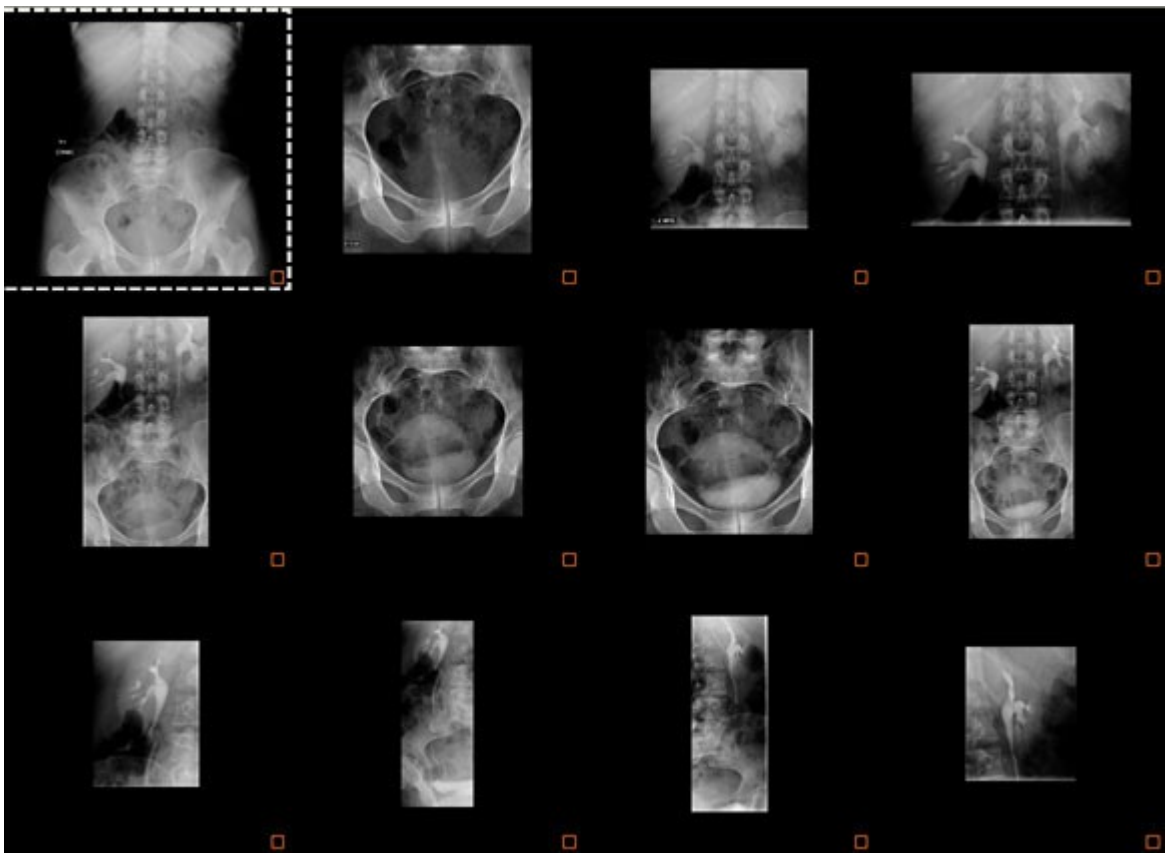
CT and IRM: 2x2 (on screen).
MG: presentation of mammography examination.
CR,DX, US, XA ...: all images in the series.

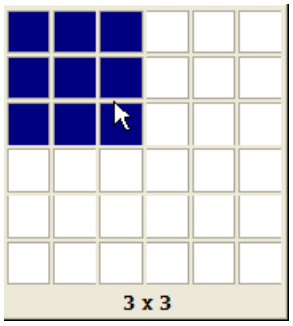
The two buttons below may be used to change the display format:

	Display all open images from the series on the screen
	Selection of the display matrix

31.2 Example

The series to be displayed is a DX series, therefore all images are displayed.



Click on , the following window opens 

, select the layout (this represents the screen matrix format).

Click to enter the new layout.

Warning : A maximum of 36 images per screen is possible.

To obtain the default display, click on .

- If no image is selected, the software automatically calculates the matrix format to display all images.
- If several images are selected, the software automatically calculates the matrix format to only display the selected images. In this case, images are ordered in the same order as the image selection (the first image selected will be the first image displayed, etc...). Images are automatically deselected during a new display, as well as by clicking on . The software displays all open images again.

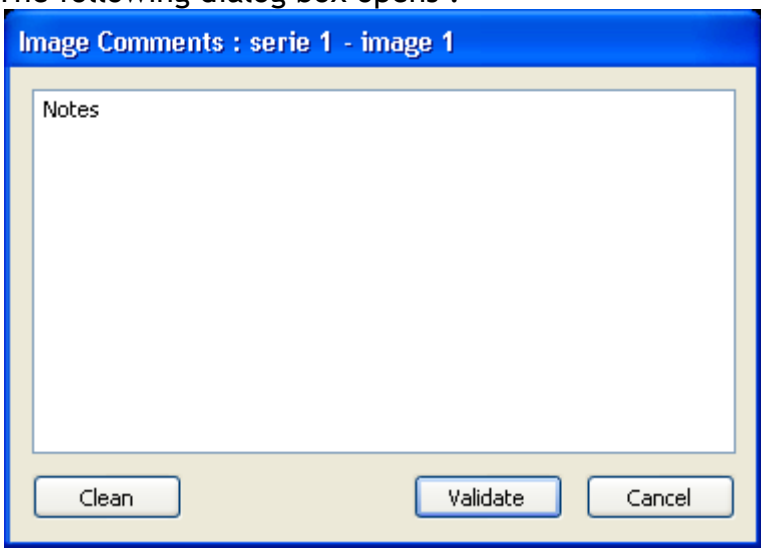
32 Adding a comment to the image

You can add a comment to the active image. The comment will be saved in the DICOM tag [0020,4000] using the button :

if the button is not available, you can add it using the Configuration menu, Options/Toolbar/Image.

32.1 Add a comment

- Select the image to which you want to add the comment
- Click
- The following dialog box opens :



- Type the text
- Click on validate
- The comment is added
- The icon is added in the bottom right corner of the image meaning this image has a comment
-

32.2 Read a comment

Comments can be displayed automatically or manually, depending on the configuration.

To select the mode :

Options>configuration>Preferences>Show image comment when loaded

32.2.1 Automatic :

Load a study

Each comment is displayed in a tool tip window.

32.2.2 Manual

Click on the icon to display the tool tip window.

32.3 Closing a comment

Click on the closing cross on the tool tip.

32.4 Modifying a comment

Select the image

Click on to open the following dialog box

Modify the text

Click on validate to save the modification

32.5 Delete a comment

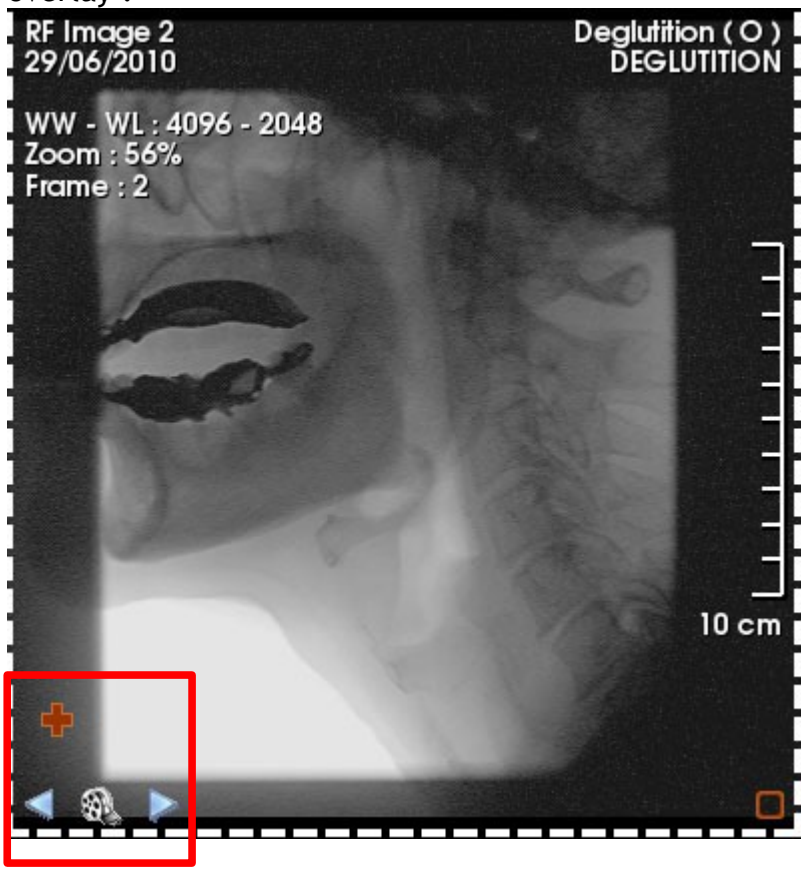
Click on to open the following dialog box

Click on clean and Validate

The icon is removed

33 Unstacking a dynamic sequence

This tool is used to unstack images from a video sequence. It can be usefull to prepare print out.
Video sequence are mainly in RF, US, XA modalities.
Video sequences are easily identifiable on the viewer by the special tools on the overlay :



Tips : to browse quickly in the sequence, you can use keyboard shortcuts :

N key	Next image in the sequence
B Key	Previous image in the sequence
C Key	Select an image in the sequence

33.1 Unstack the whole sequence

- Open the sequence
- Press CTRL +
- The whole sequence will be unstack. You'll see a maximum of 36 images in the viewer, click on the next page to see more.

33.2 Unstack selected images from the sequence

- Open the sequence
- Select in the sequence the images you want to unstack
- When the image is selected the icon is set to :
- When the selection is finished click on to unstack the sequence.
- Only selected images will be unstacked.

34 Adding measurements to an image

34.1 Accuracy of measurements

Accuracy of measurements depends of several parameters :

- Image resolution
- Calibration done by acquisition workstation
- Conditions for measurements on workstation

34.1.1 Image resolution

The measurement accuracy depends of image resolution, that is to say the size of a pixel.
The measurement accuracy is up to the size of a pixel.

34.1.2 Image calibration

Depends on which modality, the calibration done by the acquisition workstation can be :

- **No calibration.** The information of pixel size present in DICOM images corresponds to the pixel size at the level of the sensor. This pixel size do not take into account the geometric magnification. The measurement accuracy depends on the acquisition geometry. In such case the uncertainties on measurement is about 10 %.
- **Geometry Calibration.** The information of pixel size present in DICOM images take into account a calibration for a given distance to the sensor. The measurement done on objects which are to given distance of the sensor and close to central ray is pretty accurate. The uncertainties on measurement is about the size of pixel.
- **Fiducial Calibration.** The information of pixel size present in DICOM images take into account a calibration done with a measure on a know size object visible on the image. The measurement done on objects which are the same distance of the visible object and close to central ray is pretty accurate. The uncertainties on measurement is about the size of pixel.

If information about calibration is present in DICOM images, it can be displayed on the image by changing overlay display level. See the section “Display patient information”.

34.1.3 Performing measurement

The image should be displayed at least with a zoom of 100% when performing measures ! Indeed, precision of measures depend on the display zoom :

- With a 100% zoom, one pixel of the screen corresponds to one pixel of the image, thus the maximum precision can be achieved : it corresponds to the

pixel spacing of the image.

- With a zoom greater than 100%, one pixel on the image corresponds to several pixels on the screen, thus it can be easier to identify the selected pixel, but the precision of the measure is still the same.
- With a zoom lower than 100% the precision of the measure decreases, as one pixel on the screen corresponds to several pixels on the image.

The precision of the measure is also limited by the display of the result. With the default configuration, the result is displayed with 1 mm precision. The user can choose to display the result with 0,1 mm precision.

34.2 Presentation

In order to add measurements to an image, start by selecting an image in order to make it active. Then click on on the toolbar to enter into measurement mode to display the toolbar:

34.3 Quit measure and annotation mode

Click on to go back to normal mode.

34.4 Quality control

In this chapter, you'll find the measure calibration procedure to guaranty a good result. The software take into account the file DICOM information. The "pixel size" DICOM field (number 0028,0030) is used for the measure computing. However, to trust the software, we advised user to do periodic check, after the software maintenance for example.

The length quality control procedure uses a leaded ruler on the X-Ray panel. Take the acquisition, display the image in the software. Measure the ruler with the length tool (take 2 points as far as possible to reduce the measure error). The measure error depends on the acquisition geometry : ruler position compared to acquisition panel and the focal distance. The error toleration depend on the operator. A good error toleration is 1 mm for a 400 mm ruler.

A bigger variation should be taken into account immediately. The operator should redo the procedure. If the same variation is found, the operator should call the technical service to solve the issue.

Warning : The measurements are made using information contained in the DICOM files. For an exact measurement, place an object with a known size and calibrate the image.

Warning: The minimum measurement size is 5 pixels. The measurement is canceled if the size is below 5 pixels. The line width can be changed from 1 pixel to 6 pixels (see configuration for that). We advise the 1 pixel width to keep visible the image.
The measurement error depend on the type of the measure and the pixel size. The measurement error is below 1%. The measurement error do not take into account the whole acquisition workflow, only the DICOM image.

34.5 Tips

- To add a measurement on top of a measurement or existing annotation, press SHIFT while you are drawing the first point on the new annotation.
- To select a measurement, move the cursor over the measurement, the measurement changes colour and the cursor changes shape (depending on the actions available for that measurement).
- To delete a measurement, place the cursor on the measurement. Double-click with the left button on the mouse to delete it.

34.6 Deleting

34.6.1 One measure

- Position the cursor on the annotation
- to delete.

34.6.2 All measures and annotations

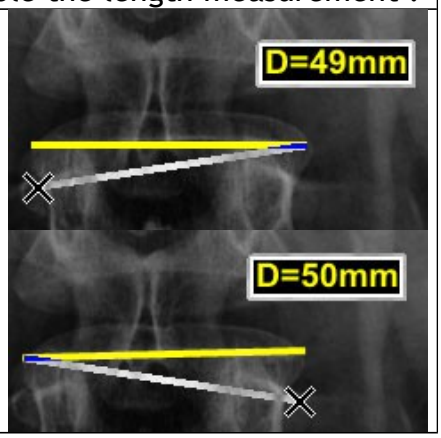
Click on

34.7 Modifying a measure

Each measure has construction points that can be modified. By moving the mouse on this points, you can modify the measure. For example the length measurement :

Position the cursor on the line. The cursor changes shape. Click on , keep it pressed down while the cursor is being moved.

Release to redraw the measurement in the new position and update its value.

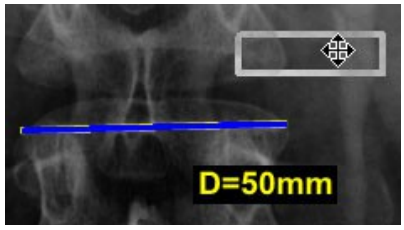


34.8 Moving a measure

34.8.1 Moving a measure's text

To move the text, position the cursor on the text . The cursor changes shape. Click on , keep pressed down while the cursor is being moved.

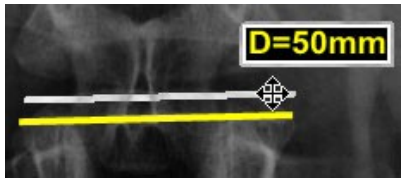
Release to redraw the measurements in the new position



34.8.2 Moving a measure

To move the segment, position the cursor on the line. The cursor changes shape. Click on , keep it pressed down while the cursor is being moved.

Release to redraw the measurement in the new position.



34.9 Goniometry measurement

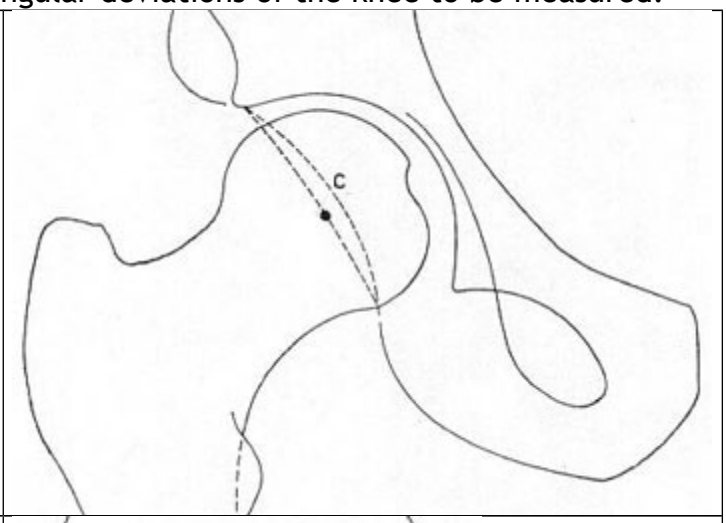
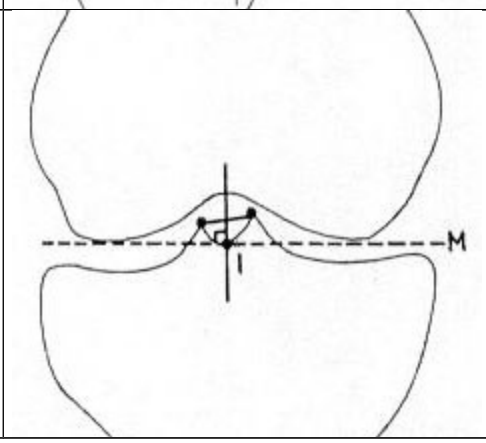
The following tool has to be selected to measure goniometry: .
The goniometry measurement can be done in 3 different modes, depending on the number of drawing points.

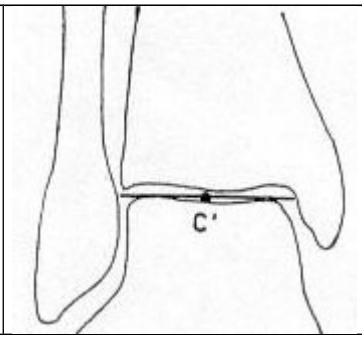
- 3 points mode
- 9 points mode (default mode)
- 12 points mode
-

WARNING : for each measurement, the measured angle is defined by the user as described in 34.9.4. This configuration is saved for the next measurements.

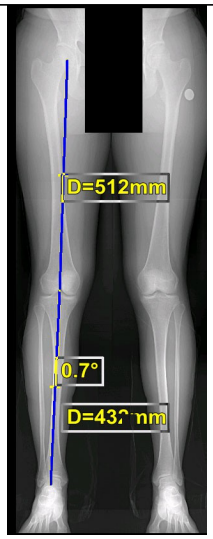
Tips : To change mode, go to Option/Configuration/Measures Annotations and select the right mode.

Goniometry measurement allows angular deviations of the knee to be measured.

Centre of the femur head	
Radiological centre of the knee joint	

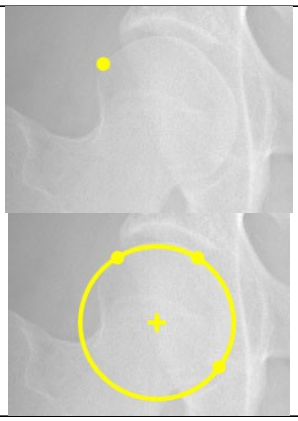
Middle of the intermalleolar distance at a tangent to the upper edge of the astragal	

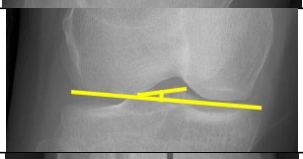
34.9.1 3 points mode

To start, click on to position the cursor in the centre of the femur. Then click on to position the radiological centre of the joint. Finally, click to position the middle of the of the intermalleolar distance at a tangent to the upper edge of the astragal. The goniometry measurement is then displayed. The measurements displayed are the angle of goniometry in addition to the length of the two segments and the middle of each segment. To make a precise measurement, use the available annotations (Middle and perpendicular line and 3 point circle…) to construct the 3 references points.	

34.9.2 9 points mode

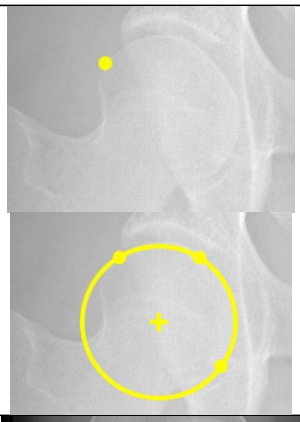
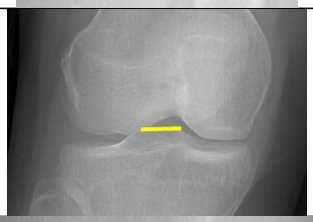
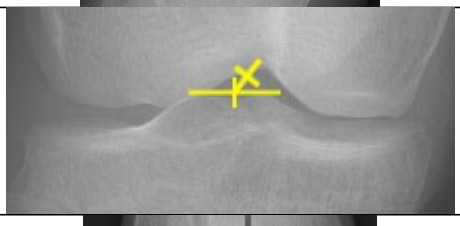
With the 9 points mode, drawing tips steps are displayed in the balloon window

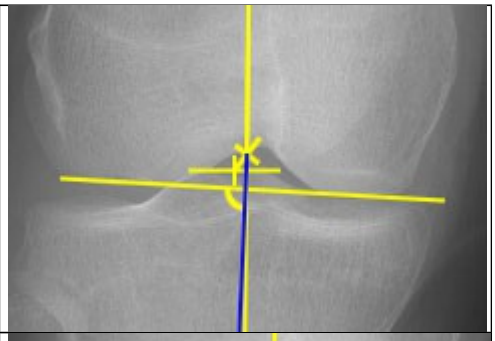
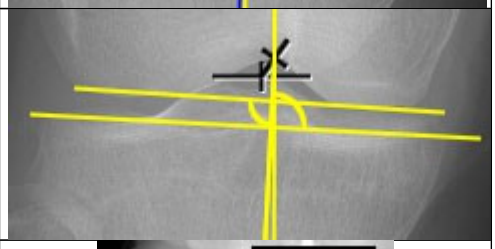
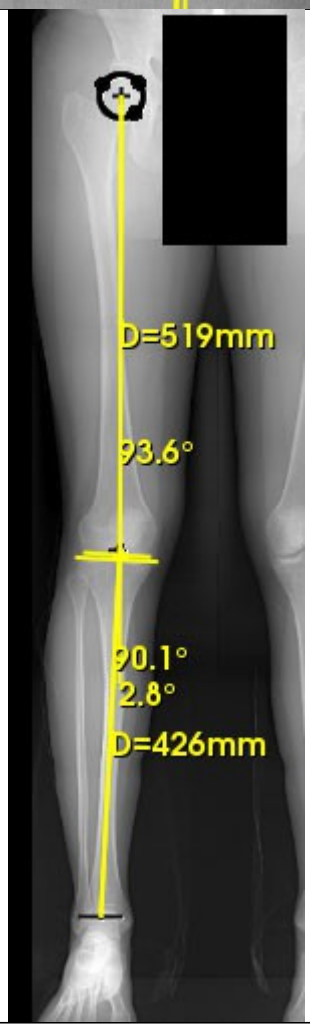
Click to draw the three points of the circumscribed circle of the femur head.	

Click on to draw the intercondylar eminence line of the tibia	
Click to draw the tangent to the femoral condyles.	
Click on to draw the inter malleolar segment tangent to the upper side of astragal.	
The measure is done.	

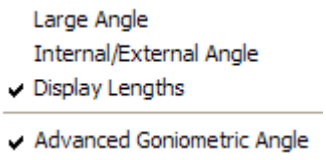
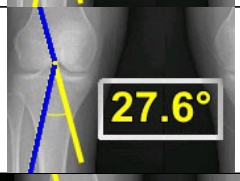
34.9.3 12 points mode

With the 12 points mode, drawing tips steps are displayed in the balloon window

Click to draw the three points of the circumscribed circle of the femur head.	
Click on to draw the intercondylar eminence line of the tibia	
Click to draw the femoral intercodylar notch.	
Click on to draw the inter malleolar segment tangent to the upper side of astragal.	

Click on to draw the tangent to the femoral condyles	
Click to draw the tangent to the tibial plateau	
The measure is finished.	

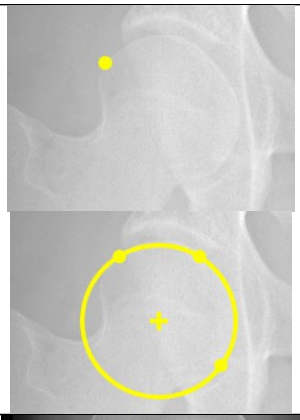
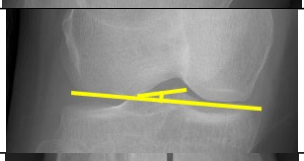
34.9.4 Modifying

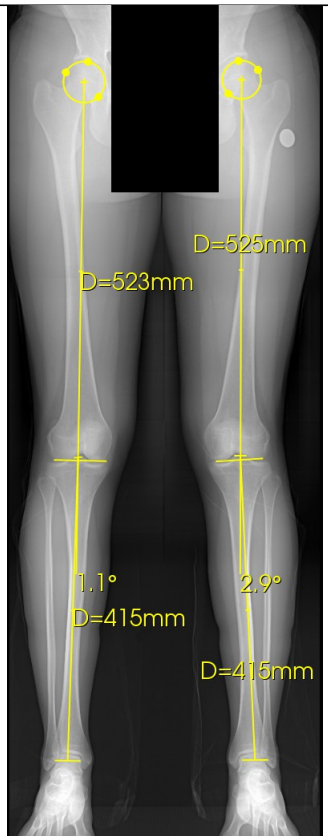
It's possible to modify the displayed information of the goniometric angles. Select the measure, click on to display the contextual menu.	
By selecting in the contextual menu : External Large angle	
By selecting in the contextual menu : Internal large angle	
By selecting in the contextual menu : Internal small angle	
By selecting in the contextual menu : External small angle	

34.10 Double goniometry measurement

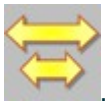
The following tool has to be selected to measure a double goniometry: .
The goniometry measurement corresponds to two simple goniometry measurements, with a 9 points configuration, and with an automatic display of extern or intern angles : the angle is displayed with a negative value in case of varus, and with a positive value in case of valgus.

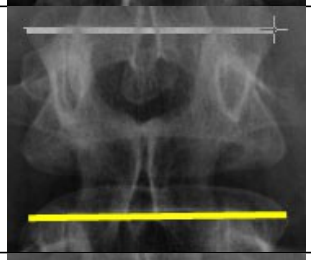
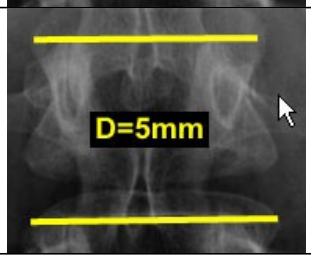
Goniometry measurement allows angular deviations of both knees to be measured.
Drawing tips steps are displayed in the balloon window.

Click to draw the three points of the circumscribed circle of the femur head.	
Click on to draw the intercondylar eminence line of the tibia	
Click to draw the tangent to the femoral condyles.	
Click on to draw the inter malleolar segment tangent to the upper side of astragal.	

Apply the same steps for the second leg. Measurement is done.	

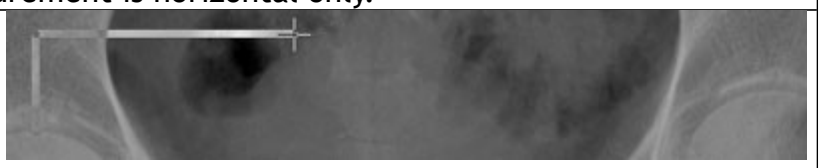
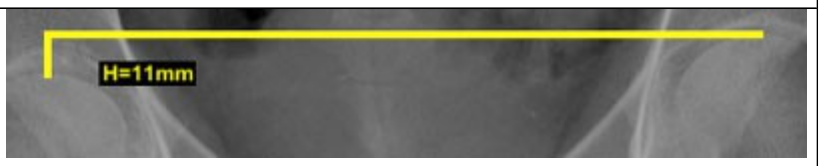
34.11 Adding a difference in length measurement

The following tool has to be selected in order to measure the difference in length:  .

To start, click on in the area where you want to draw the first segment	
Click on and keep it pressed down while the cursor is moved. Release to draw the first segment. Move the cursor to the location of the start of the second segment.	
Click on, and keep pressed down while the cursor is moved. Release to draw the second segment.	
Once in the required location, release. The difference in length between the two segments is displayed.	

34.12 Adding a difference in height measurement

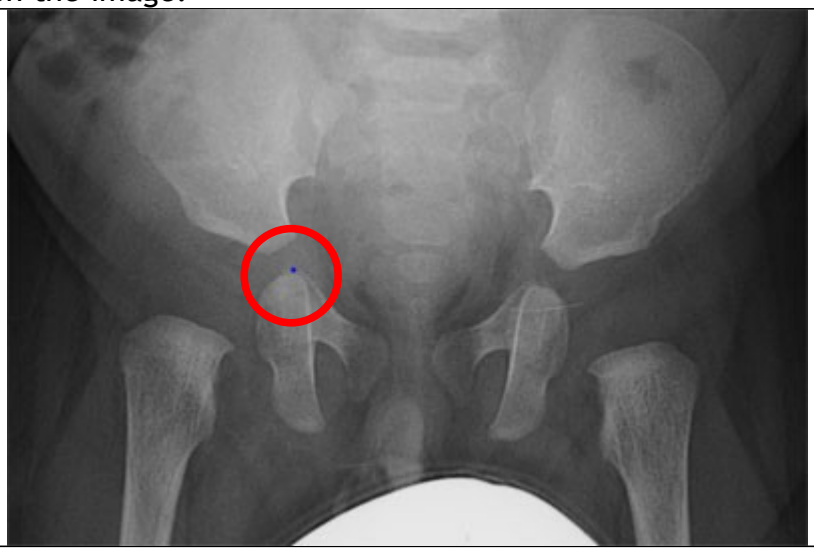
The following tool has to be selected to measure length: .

To start, click on in the location where you want to start the height measurement. Height measurement is horizontal only.	
Then move the cursor while keeping pressed down to the second height measurement point.	
Once in the required location, release . The height measurement and value appear.	

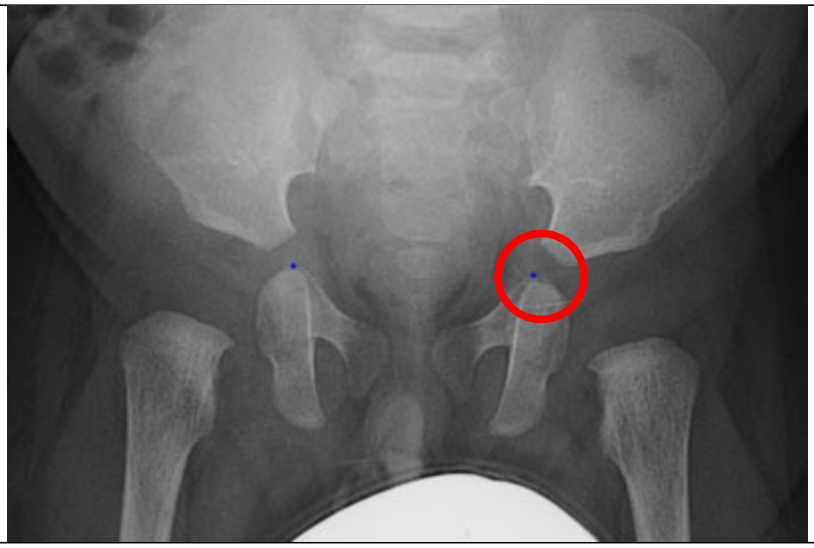
34.13 Adding Baby Hip Displasia Measurement

Select the baby hip displasia measurement tool . You need 4 points to build this measurement.

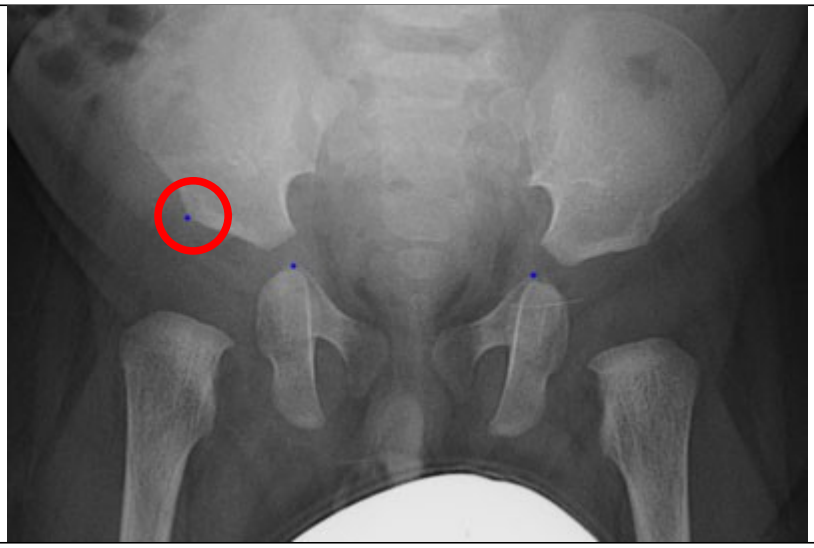
To set the right Y cartilage point. In this example the right Y cartilage is selected. You can follow step by the step construction of the measurement with the help balloon on the image.



To set the left Y cartilage point as shown in the help balloon

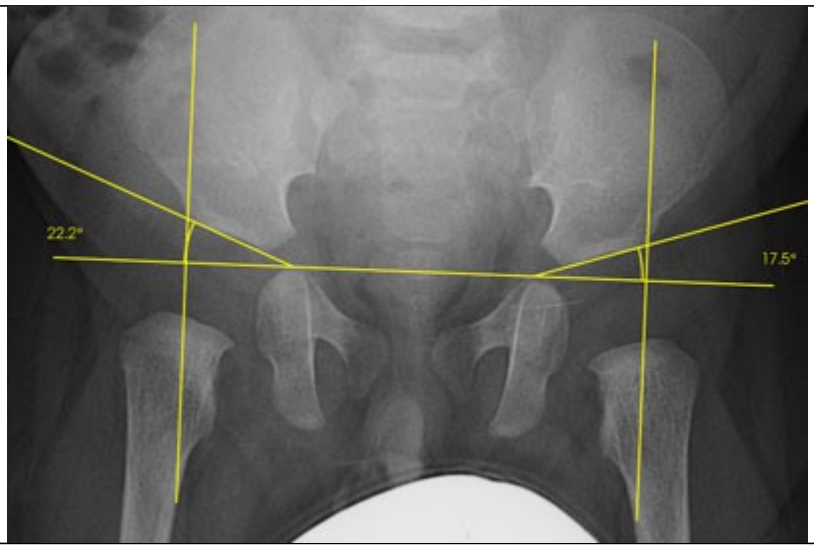


To set the right cotyl roof point



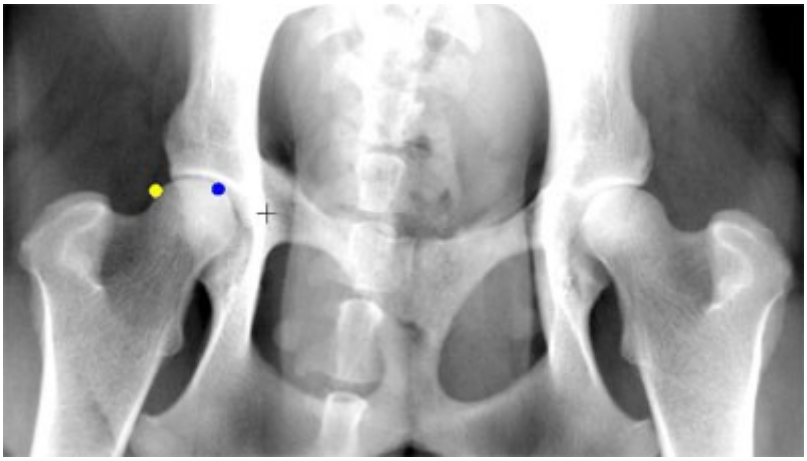
To set the left cotyl roof point

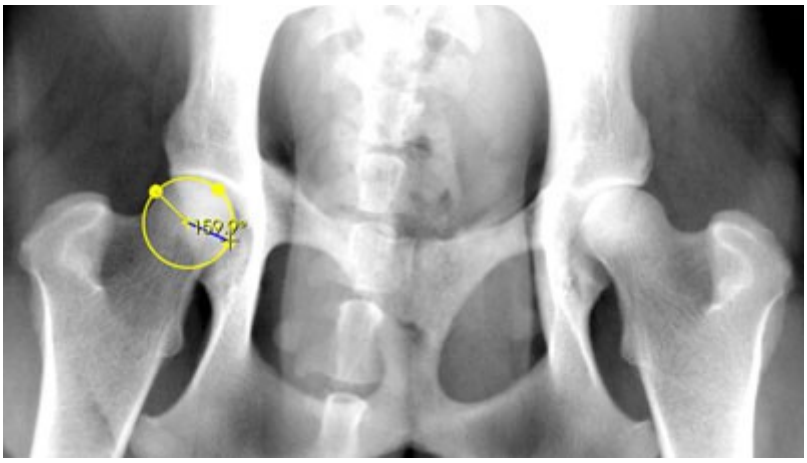
The measure is finished



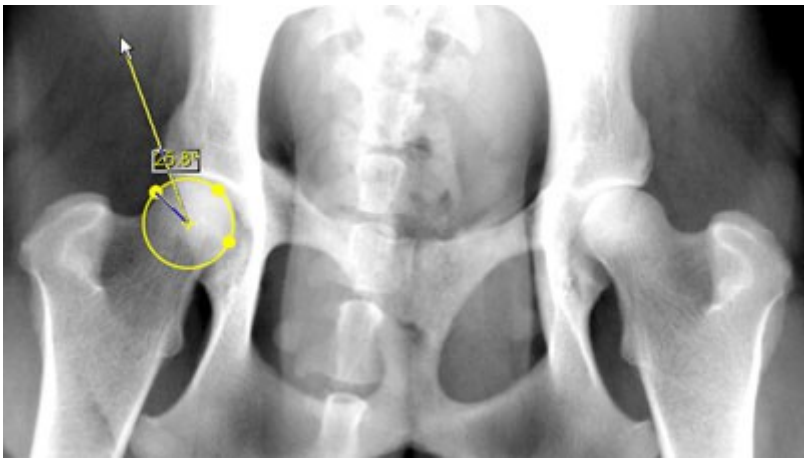
34.14 Adding a Coxofemoral Hip Displaysia measurement (Norberg-Olson angle)

Select the following tool . You need 8 points to build this measurement.

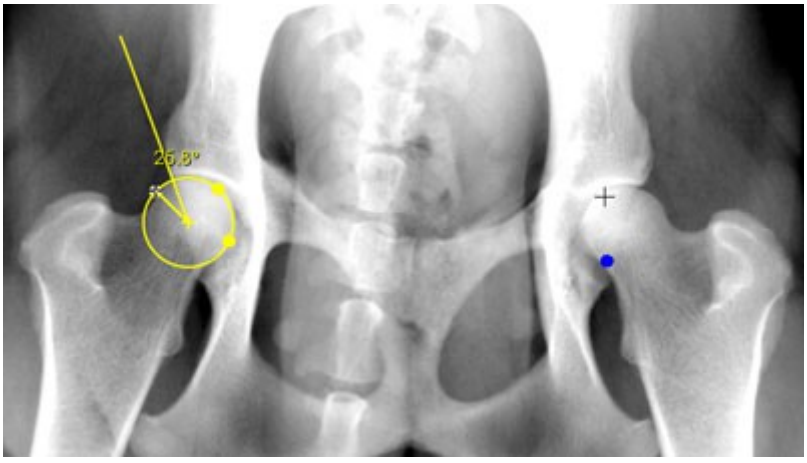
to set the set first point of the circle around the femoral head. For example start on the right side. You can follow the instruction with the help balloon on the screen
to set the second point of the circle around the femoral head

to set the third point of the circle around the femoral head



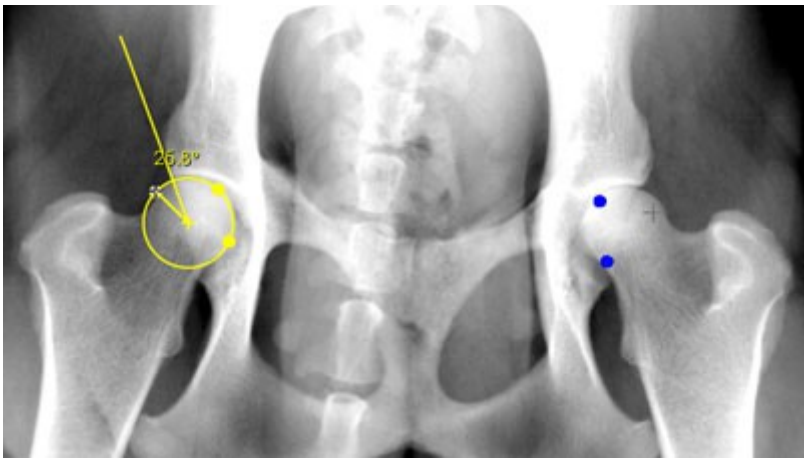
to set the point on the acetabulum on the same side (right in this example). The value of the angle will be calculated at the end of the measurement.



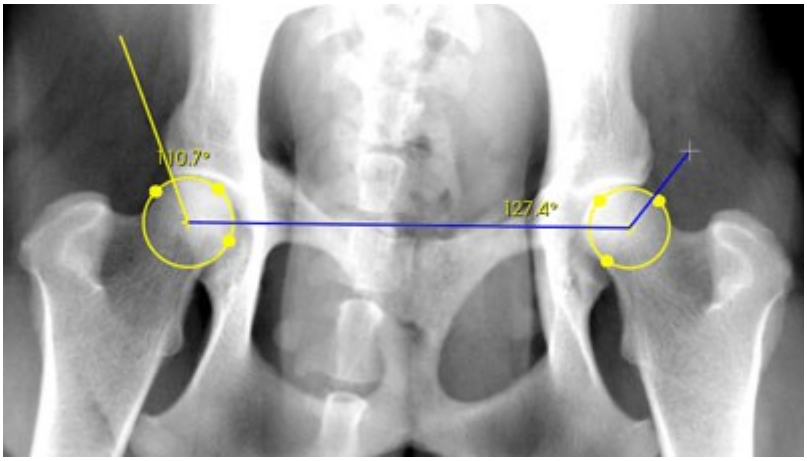
to set the first point of the circle around the left femoral head.



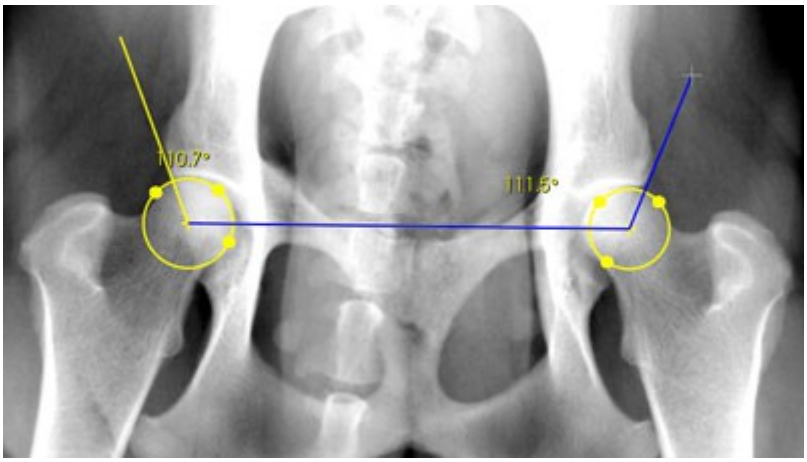
to set the second point of the circle around the left femoral head.



to set the third point of the circle around the left femoral head.



to set the point on the acetabulum on the same side (left in this example).



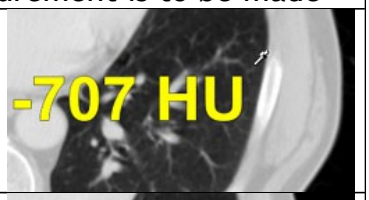
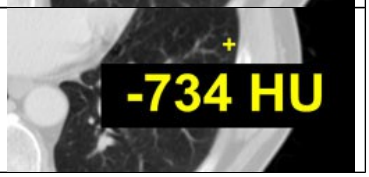
The 2 angles are calculated

34.15 Adding a density measurement

The following tool has to be selected to measure density: .

Warning: The density of the scanner images is expressed in HF units. For all other images, there is density information but this has no relationship with the anatomical part displayed.

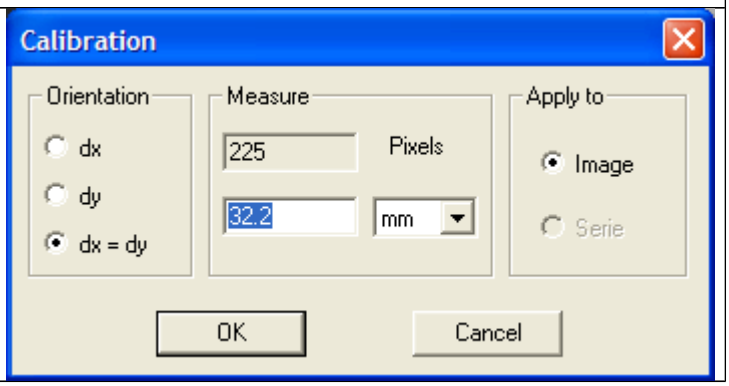
Density measurement is made in a 5x5 pixel micro region.

To start, click on in the location where the density measurement is to be made	
Move the cursor keeping pressed down, the density value changes.	
To set measured density, press the CTRL key before releasing .	

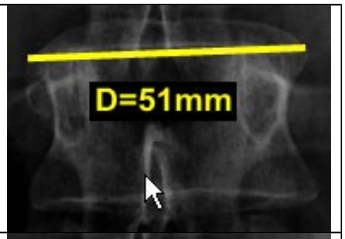
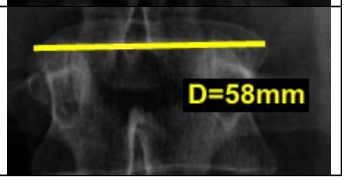
34.16 Calibrating the measurements

The following tool has to be selected to calibrate the length measurement:

.

To start, click on in the location where you wish to start the length measurement. Then move the cursor keeping pressed down.	
Once in the required location, release . The calibration window opens. Indicate the corresponding exact distance. Click on OK so that the new calibration is taken into account. Important: Measurements made prior to calibration are not modified.	

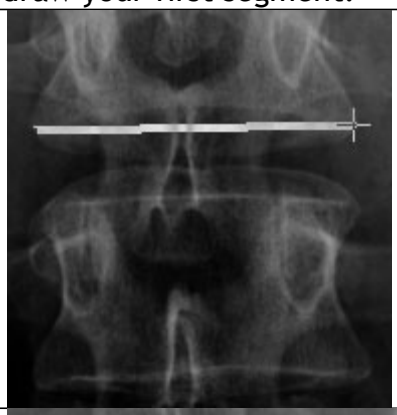
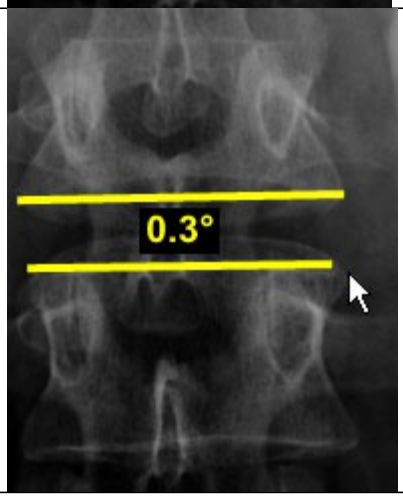
34.16.1 Example

Before calibration.	
After calibration	

34.17 Adding an open angle measurement

The following tool has to be selected to measure the angle: .

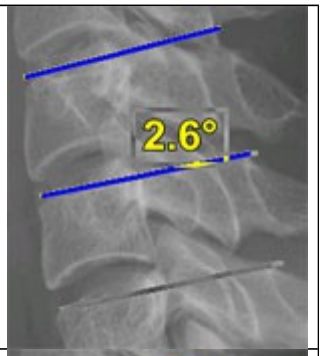
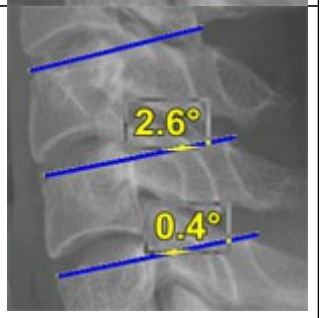
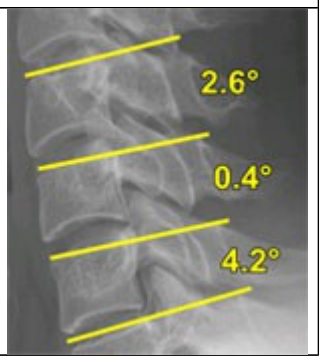
Tip: To obtain the complimentary angle, keep the CTRL key pressed down and double-click on the value of the angle. The complimentary angle appears. Repeat to return to the initial value.

Click on in the area where you want to draw your first segment.	
Click on, and keep it pressed down while the cursor is moving. Release to draw the first segment.	
Move the cursor to the area of the start of the second segment. Click on, and keep it pressed down while the cursor is moving. Release to draw the second segment. **Warning:** The measured open angle cannot exceed 90°. Once in the required location, release. The angle between the two segments is displayed.	

34.18 Adding a measurement of multiple open angles

The following tool has to be selected to measure the angle : .

Tip: To obtain the complimentary angle, keep the CTRL key pressed down and double-click on the value of the angle. The complimentary angle appears. Repeat to return to the initial value.

Click on in the location where you want to draw your first segment.	
Click on , and keep it pressed down while the cursor is moving. Release to draw the first segment. Move the cursor to the location of the start of the second segment. Click on , and keep it pressed down while the cursor is moving. Release to draw the second segment. Once in the required location, release . The angle between the two segments is displayed.	
Move the cursor to draw the new angle. to enter the measurement. You may draw as many angle as you want. **Warning:** The open angle must not exceed 90°.	

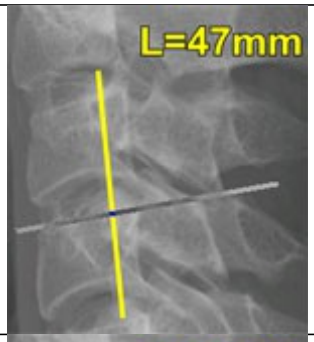
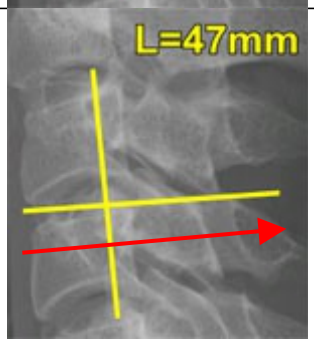
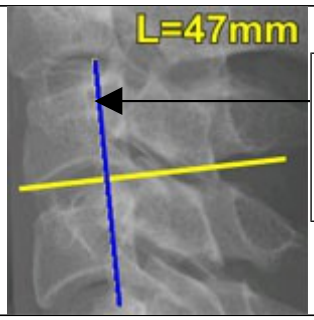
34.19 Adding an angle measurement with an intersection

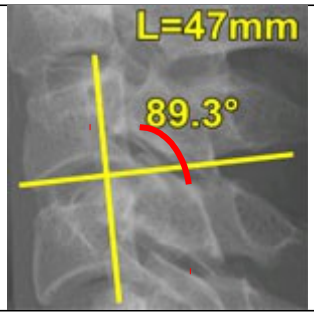
The following tool has to be selected to measure an angle with an intersection: .

You may draw an angle with the following existing measurements:

- Length measurement
- Line annotation
- Perpendicular annotation
- Closed angle measurement and goniometry measurement
- Hip height measurement

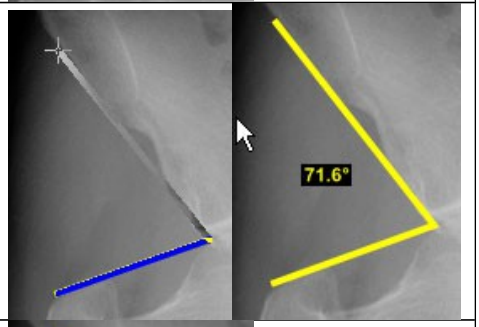
Tip: To obtain the complimentary angle, keep the CTRL key pressed down and double-click on the value of the angle. The complimentary angle appears. Repeat to return to the initial value.

Draw the measurement from which you want to measure an intersection angle.	
Click on , and keep it pressed down while the cursor is moving. Release to draw the intersection segment. NB: The direction in which you create the intersection will define the angles measured. Here the direction is as follows:	
Click on the measurement segment shown to display the angle.	 Position of the cursor and

The measured angle is displayed. For information here, the measured angle is shown	

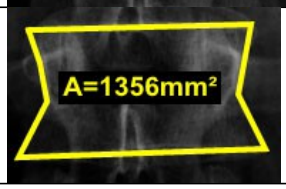
34.20 Adding an angle measurement

The following tool has to be selected to be able to measure an angle measurement: .

Click on in the location where you wish to draw the top of the angle.	
Click on and keep it pressed down while the cursor is moving. Release to draw the first segment.	
Move the cursor to draw the second segment. Click on to finish drawing the angle.	
Tip: To obtain the complimentary angle, keep the CTRL key pressed down and on the value of the angle. The complimentary angle appears. Repeat to return to the initial value.	

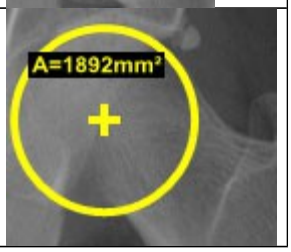
34.21 Adding a polygonal surface measurement

The following tool has to be selected to measure a polygonal surface: .

To start, click on in the location where you want to start your polygonal surface.	
Then mover the cursor and click each time you wish to add a point to the polygon.	
To finish the polygon, 2, the drawing and the value are displayed.	

34.22 Adding a circular surface measurement

The following tool has to be selected to measure a circular surface: .

To start, click on in the location where you wish to place the centre of the ellipse.	
Then move the cursor, the ellipse becomes larger...	
Release to draw the measurement and the value of the surface.	

34.23 Adding a length measurement

Length tool has 2 different measures

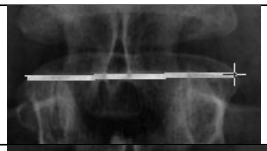
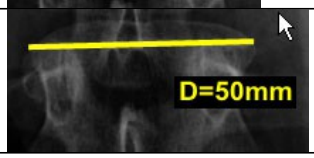
- One simple measure
- One measure with the segment middle

To select the tools, click on or for 1 second, the toolbar opens select the right measure.

Warning : the last used tool is saved for future use.

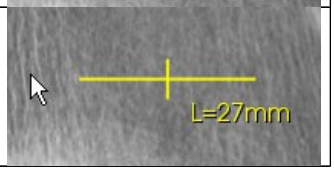
34.23.1 Length

Select the length tool .

Click on in the place where you wish to start your length measurement.	
Then move the cursor with pressed down.	
Once in the required location, release. A segment and the length value appears.	

34.23.2 Length and middle

Select the length tool .

Click on in the place where you wish to start your length measurement.	
Then move the cursor with pressed down.	
Once in the required location, release. A segment and the length value appears. The segment middle is visible	

34.24 Adding a cardio-thorax index

The following tool has to be selected in order to measure the cardio-thorax index: .

To start, click on in the area where you want to draw the first segment	
Click on and keep it pressed down while the cursor is moved. Release to draw the first segment. Move the cursor to the location of the start of the second segment.	
Click on, and keep pressed down while the cursor is moved. Release to draw the second segment.	
Once in the required location, release. The cardio-thorax index is displayed.	

35 Adding annotations

35.1 Presentation

To add annotations to an image, start by defining it as an active image. Then click on the tool bar to enter annotation mode. You may then select the annotation which is to be added. Some annotations may assist in constructing complex measurement (goniometry for example).

On starting up, the default drawing annotation is . Then, the last annotation selected remains the default annotation while the station has not been turned off.

To select another drawing annotation, use the mouse to click on the button located under the text annotation ( ). Keep the button pressed for one second, the annotations tool bar then opens:

35.2 Quit measure and annotation mode

Click on to go back to normal mode.

35.3 Tips

- To add a measurement on top of a measurement or existing annotation, press SHIFT while you are drawing the first point on the new annotation.
- To select a measurement, move the cursor over the measurement, the measurement changes colour and the cursor changes shape (depending on the actions available for that measurement).
- To delete a measurement, place the cursor on the measurement. Double-click with the left button on the mouse to delete it.

35.4 Deleting

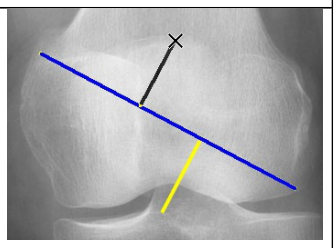
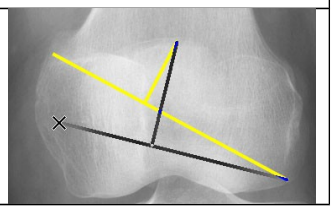
35.4.1 One measure

- Position the cursor on the annotation
- to delete.

35.4.2 All measures and annotations

Click on

35.5 Modifying an annotation

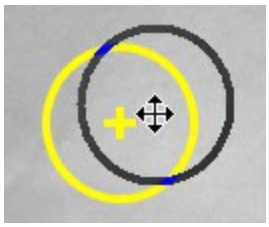
Each annotation has construction points that can be modified. By moving the mouse on this points, you can modify the annotation measure. For example the line with right angles :
The location and the size of the segment at right angles can be changed: place the cursor on the segment. Click on and keep pressed down while the cursor is moved. Release to redraw the segments. 
The main segments can also be moved by selecting one of its ends. Click on , and keep it pressed down while the cursor is moved. Release to redraw the segments. 

35.6 Moving a measure

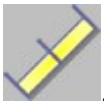
35.6.1 Moving a text

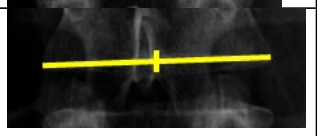
To move the text, position the cursor on the text . The cursor changes its shape. Click on , keep pressed down while the cursor is being moved. Release to redraw the measurements in the new position	

35.6.2 Moving an annotation

To move the segment, position the cursor on the line. The cursor changes its shape. Click on , keep it pressed down while the cursor is being moved. Release to redraw the measurement in the new position.	

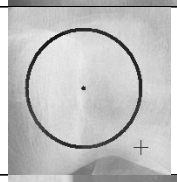
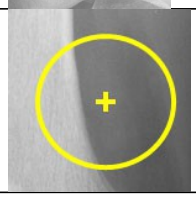
35.7 Adding a line with the middle marked

To draw a line with its middle marked, following tool must be selected:  .

Start by placing the cursor on the end of the line and click on .	
Then move the mouse keeping pressed down.	
Once the cursor is in the right position, release . The line appears and the middle is indicated by a small line at right angles.	

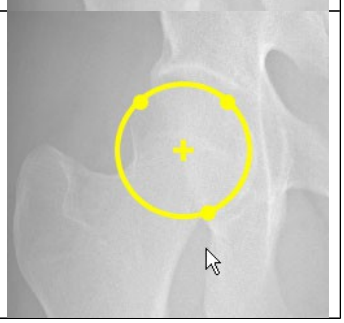
35.8 Adding a circle

The following tool must be selected to draw a circle or an ellipse: .

Start by placing the cursor on the centre of the circle and click on .	
Then remove the cursor keeping pressed down to draw the ellipse.	
Tip: To draw a circle, press CTRL while the cursor is being moved.	
Once the circle or ellipse is the required size, release . The circle or ellipse is drawn.	

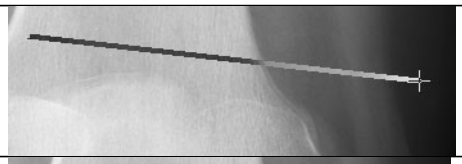
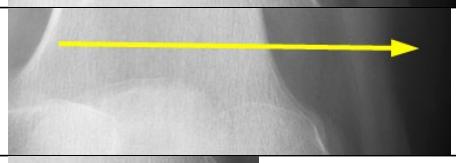
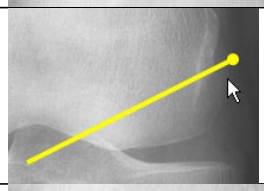
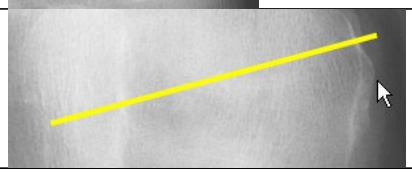
35.9 Adding a circle from 3 points

To draw a circle from three points, the following tool must be selected: .
The three points are three points on the edge of the circle. This annotation may be useful to delineate the head of a femur.

Start by place in the cursor on the location of the first point and click on .	
Repeat for the other two points.	
The circle is drawn once the third point is in position.	

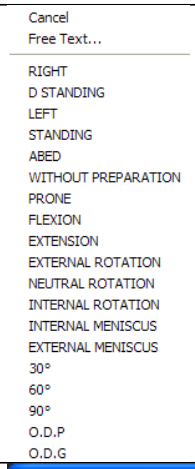
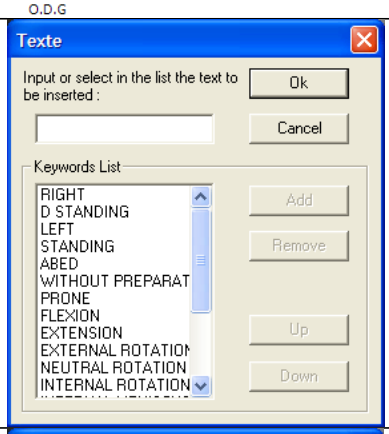
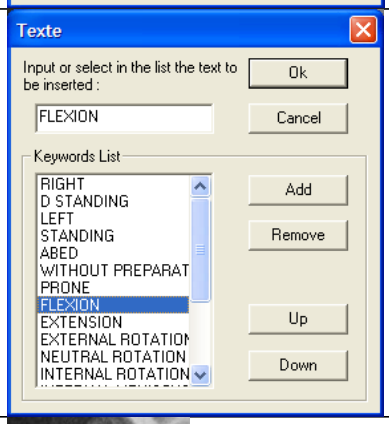
35.10 Adding a line

One of the three following tools must be selected to draw a line: .
Only the end of each line changes. The principle for drawing it is exactly the same. An example is given with the arrow.

To start, place the cursor at the beginning of the line and click	
Then move the mouse while keeping held down.	
Once the required location has been reached, release . The line appears.	
The result is as follows in the round end has been selected.	
If no end has been selected, the result is as follows.	

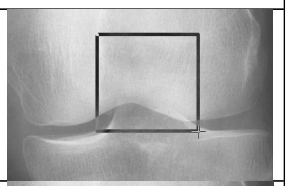
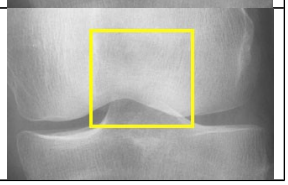
35.11 Adding a text

The following tool has to be selected to add a text: . It is possible to save a list of the most often used words in the list of key words to avoid having to search for them each time.

Position the cursor on the text and click .	
Select a key word from the list or click on new text. After having clicked on “new text”, the following dialog box appears. Type in the text. If you want to add it to the list of keywords (maximum 20 words) click on the Add button.	
Use the buttons in the dialog box to manage the position of keywords or to delete them. This way you can select the order of key words in the list.	
Once the text has been selected, it appears on the image.	

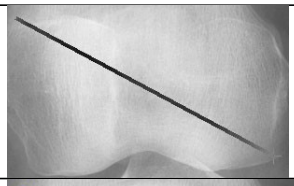
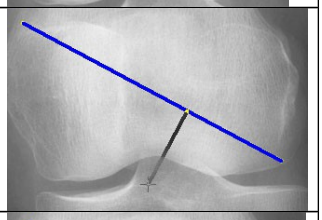
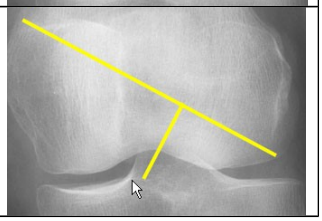
35.12 Adding a rectangle

The following tool must be selected to draw a rectangle: .

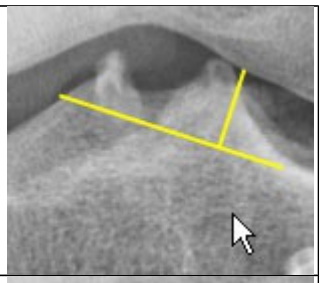
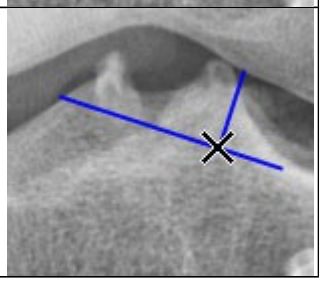
Start by placing the cursor on one of the corners of the rectangle and click on .	
Then move the cursor keeping pressed down to draw the rectangle.	
Once the rectangle is the required size, release . The rectangle is then drawn.	

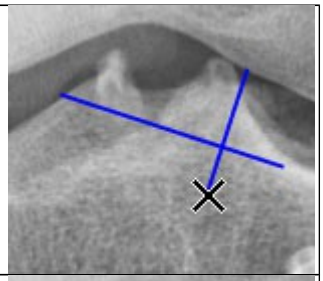
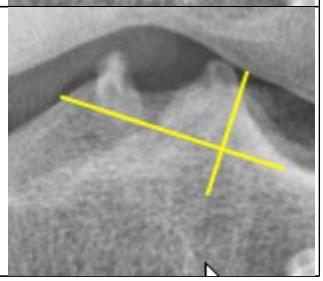
35.13 Adding a line at right angles

To draw a line at right angles, the following tool must be selected: .

Start by placing the cursor at the end of the first segment and click .	
Then move the cursor while keeping pressed down to draw the first segment.	
Once it is in the required area, release . The first segment appears, as well as the segment at right angles. Then move the cursor to move the segment at right angles.	
Click on to draw the second segment.	

35.13.1 Perpendicular segment extension

Starting from a basic perpendicular annotation, it's possible to lengthen the half segment.	
Set the mouse cursor over the intersection. The cursor shape will be as shown.	

Pressed down and move the mouse to lengthen the segment	
Release to finish the annotation	

36 Duplicating an image

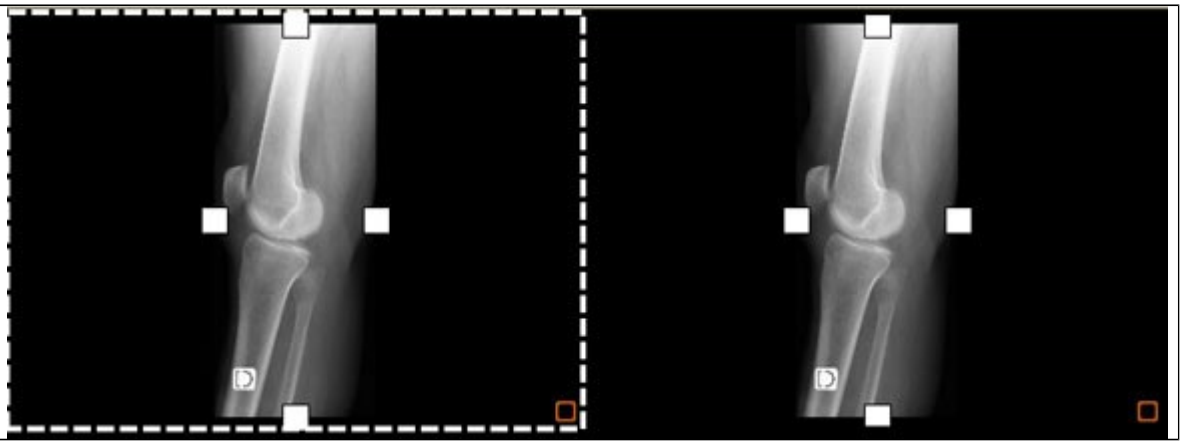
36.1 Presentation

During some examinations, it may be interesting to duplicate an image to carry out, for example, some different actions on the same image, or to use an image with several cuts.

Select the active image, click on or press **CTRL + D** or select the *Edit...Duplicate image* menu. The duplicated image is displayed to the right of the original.

36.2 Example...

On of the possible applications of the copy is to separate an x-ray plate with two exposures:

Stage 2: shutter on the two images	

37 Formatting and printing a study on a film [OPTION]

37.1 Printing on paper or printing on film

The printing mode gather the printing on paper and printing on film. The scale on paper and on film are respected. In the following chapter the word laser will be used for a DICOM laser and Windows printer. The word film will be used for a film print and a paper print.

37.2 Limitation

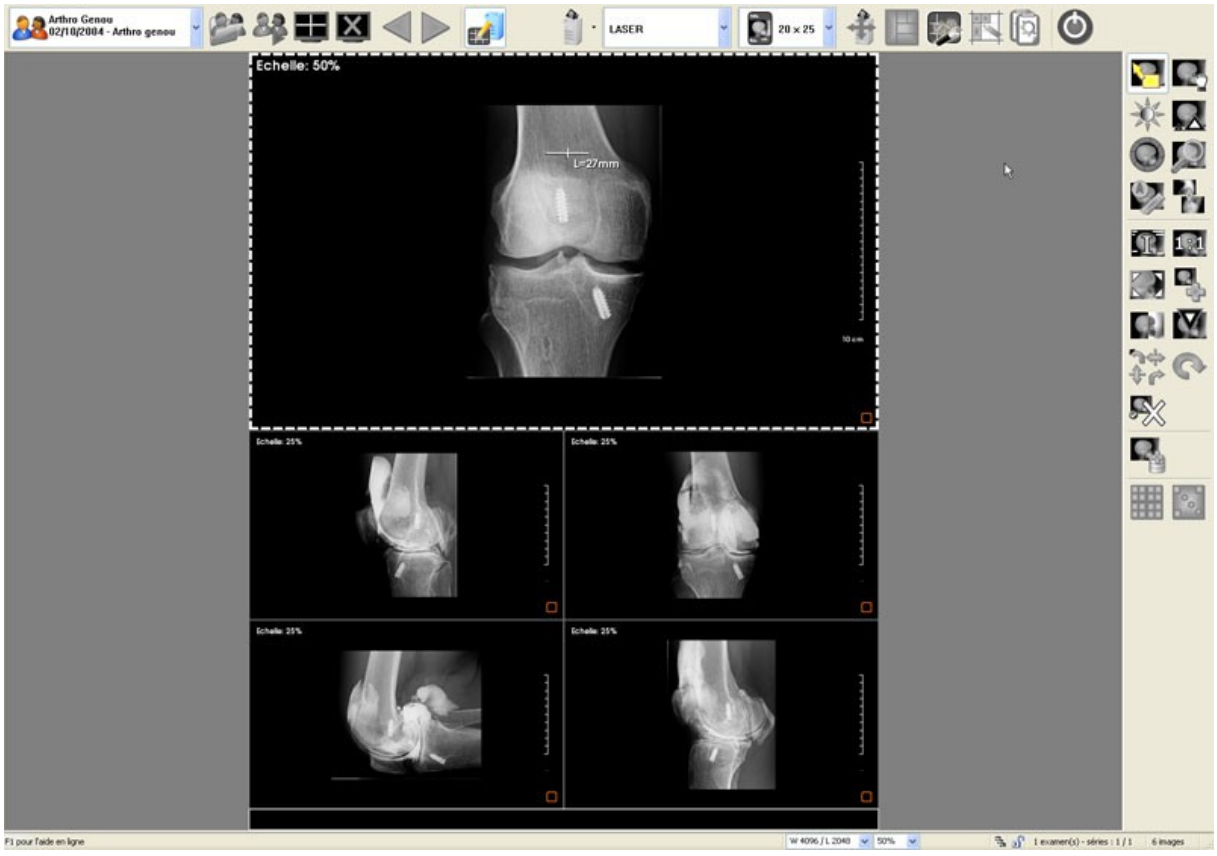
Printing non DICOM images is possible but with some limitations. For example, the print zoom is not available because the image do not contain a pixel size information. Non DICOM images are automatically adjusted to film layout.

37.3 General matters

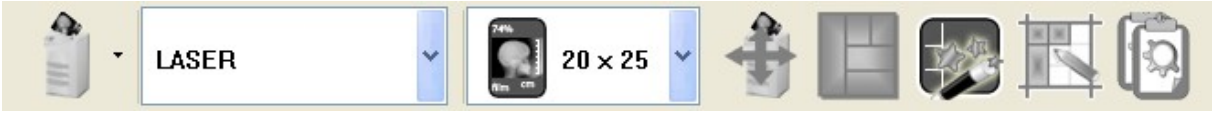
The workstation has 2 operating modes, the visualization mode and the print mode.

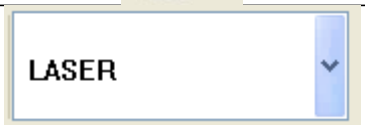
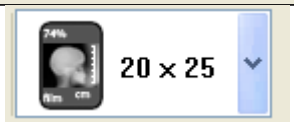
To switch to print mode click on . To switch back to the visualization mode, click on the same button. The last selected mode is selected when opening a new exam.

The print mode is dedicated to the film set up. In this mode, the user works directly on the film,. For example, the displayed scales correspond to the scales on the final film. Every change, like film format or film orientation are immediately taken into account, the workspace is modified. It is a WYSIWYG mode : 'What You See Is What You Get'.



37.4 The print mode tool bar. :

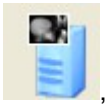


	Toggle Print mode or Visualization mode
	Print the film or select the laser (cf : 37.6)
	Selecting the laser or the windows printer
	Select film format and orientation (cf : 37.7)
	Apply same zoom on each image of the film (cf : 37.5.4)
	Select film layout (cf : 37.8)

	Display the layout templates manager (cf 38)
	Display the layout creator (cf : 37.8.2)
	Display the print queue (cf : 37.10)

37.5 Film preparation

37.5.1 Steps

- Select images to be added to the film in the study list,
- Tune the images (windowing, shutter, processing ...),
- Sort the images in the right order,
- Add measures and annotation to the images,
- Select the film format,
- Select film layout,
- Scale the images,
- Select the laser,
- Print the film by clicking on  ,

37.5.2 Printing parameters

The printing parameters can be changed :

- The zoom of each image can be changed. The zoom is the value of the print scale factor. (image size on the film vs true image size on the screen).
- The selection of the laser if more than one printer are available.
- Film format and orientation.
- Number of film copy (maximum is number of copy is 10).
- The interpolation used by the laser.
- Printing to a file, used during system tests, it can be used also to save the image of the film in JPEG or DICOM..

37.5.3 Working on the image

All tools available in the visualization mode are available in print mode. Working on the images is used to improve image quality and information, (windowing, rotation, processing, shutter, measures and annotation...). All this settings behave the same as in visualization mode. Just use them in the image tool bar. :

	Select Mode : arrange image order
	Panning Mode panning : Moving the image inside its window
	Windowing Mode : Change contrast and luminosity on the image
	Zoom Mode : Change image scale on the film

	Shutter Mode : display only one part of the image
	Measures and annotations Mode mesures et annotations : add information on the images
	Magnifying glass Mode : Enlarge a region of the image. The region can be freeze for printing
	Duplicate an image
	Open image processing menu
	Open the geometric manipulation tool bar.
	Video invert
	Open the LUT dialog box (density curves)
	Reset image to default settings.

The size of the measures and annotations texts will be the same on the screen and on the film. In print mode they are displayed in black and white.

Tips : To work precisely on an image, double click on the image to display the image 1x1. Once you've done the processing, double click again on the image to go back to the last layout. (Select the Select mode to the enable this feature before double clicking).

37.5.4 Print scale

In print mode, the print scale is tuned by using the zoom button . The scale displayed corresponds to the size on the film. For example 100% means that 1 cm of the image will be 1 cm on the film, it'll be a true size printing.

Zoom accuracy depends on calibration done on acquisition workstation.

Depends on which modality, the calibration done by the acquisition workstation can be :

- **No calibration.** The information of pixel size present in DICOM images corresponds to the pixel size at the level of the sensor. This pixel size do not take into account the geometric magnification, so the print magnification is exact for an object located on the sensor . The physical measurement on the film of an object located to a given distance of the sensor do not take into account the radiological magnification.
- **Geometry Calibration.** The information of pixel size present in DICOM images take into account a calibration for a given distance to the sensor. The print magnification is exact for all object located to this given distance and close to central ray.
- **Fiducial Calibration.** The information of pixel size present in DICOM images take into account a calibration done with a measure on a know size object visible on the image. The print magnification is exact for all object located at the same

distance of this object and close to central ray.

If information about calibration is present in DICOM images, it can be displayed on the image by changing overlay display level. See the section “Display patient information”.

Click on to get directly the 100% scale. Click on : to adjust the image to layout selected. Click on to tune dynamically the image scale.

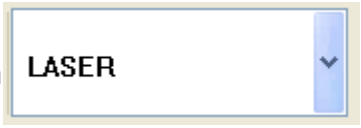
Warning : The scale information is different if you're in print mode or in visualization mode. In visualization 100% means that one pixel of the image correspond to one pixel on the screen. The print scale and the display zoom are not linked.

37.5.5 Apply an identical scale

To apply the same scale on every images on the film, click on . The applied scale depends on configuration :

- Scale of active image (by default)
- Scale of smallest image
- Scale of biggest image

37.6 Selecting the laser

To select the laser, click on the arrow on the right of the button 

. The following menu is displayed with the list of all available lasers. In this menu, you can also select the Print to file option.

37.7 Selecting the film format

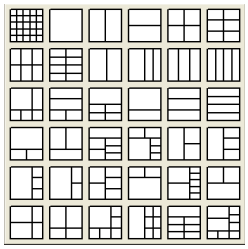
All available film format for the selected laser are displayed in the drop down list. All combination of film size and orientation are displayed :

Changing the film format change the film preview and modify all the images scales. The list contents is defined during the installation by the support technician and is link to laser settings..

37.8 Defining layout

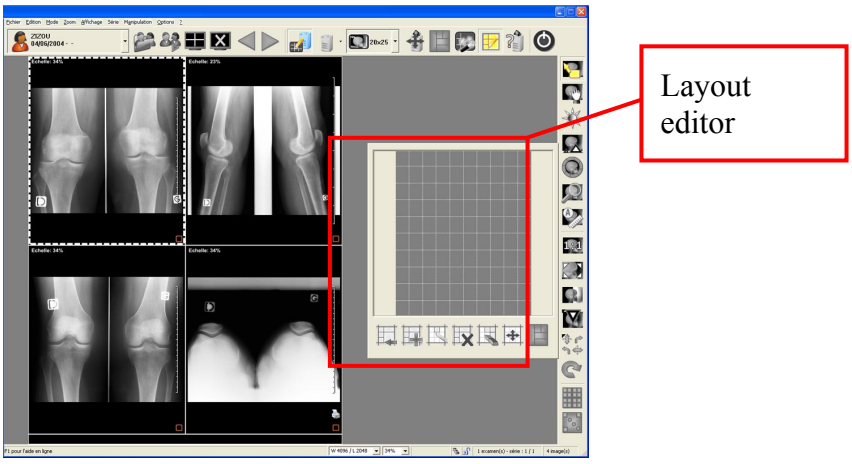
37.8.1 Selecting an existing layout

To select a new layout, click on and select the one you want to use. :

 .

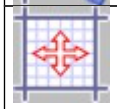
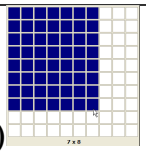
37.8.2 Creating a new layout

You can create new layout by using the layout editor. Click on . The display change to let space to the editor window to show. :

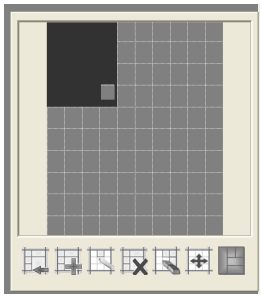
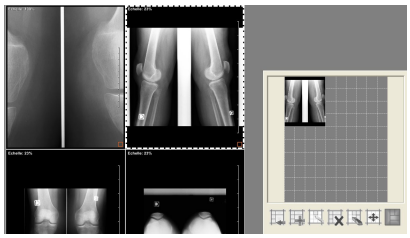
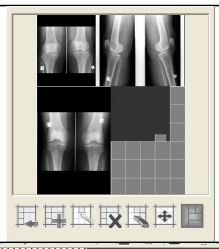


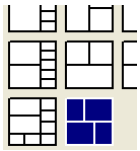
The tool bar of the layout editor has different tools :

	Apply the current layout to the film displayed
	Apply the current layout to the film displayed and add the layout into the layout selector
	Edit the layout

	Delete the layout from the layout selector
	Erase the layout
	Change layout grid resolution (10 x 10 cells maximum) 
	Open the layout selector to edit an existing layout

New layout creation example :

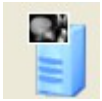
Click on to start drawing of a new layout. Select the image the image that will be displayed in the first layout. Move the mouse in the upper left corner of the first cell of the layout. Hold down and move the mouse to draw the first cell of the layout.	
Release to validate the new cell. The active image is displayed in this new cell.	
Do the same for each cell of the layout.	
One all cells defined, clicked on to apply and save the new layout.	

The new layout is available by clicking on .	

37.9 Starting the printing

37.9.1 Printing on a laser

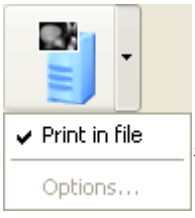
Warning : The MEDSpooler service needs to be started to allow printing. Check in the Windows system tray bar (near the clock) if the following icon is visible : . If not, click in the options of the workstation, in the Services dialog box and click on start MEDSpooler.

Start printing by clicking on  : a confirmation dialog box opens (you can disable the confirmation in the dialog box), and a tool tip is displayed :

The MEDSpooler icon in the system tray changes its color and a another tool tip is displayed :

The printing is processed in background, though you can continue to use the workstation. In special cases, printing can slow down some processing.

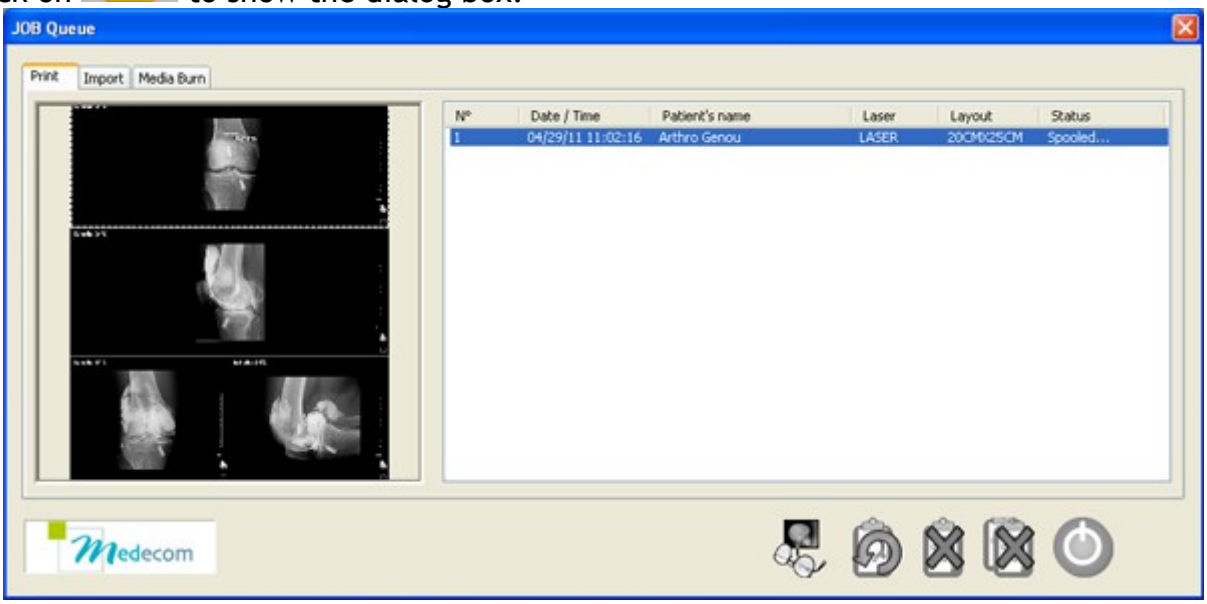
37.9.2 Printing to a file

If you want to save the film into a film, click on 

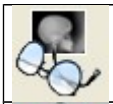
, select ***Print to a file*** and click on . Depending of the extension chosen, the printing file will be in JPEG or DCM. A tool tip will be displayed also.

37.10 Printing status

Once the printing has been launched, the printing task is saved into the print queue, click on to show the dialog box.

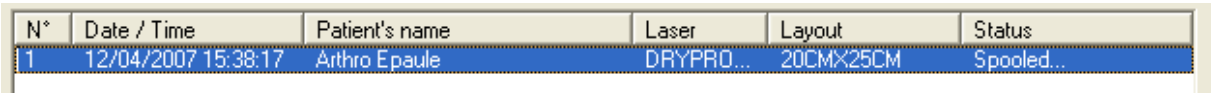


Here is the button actions :

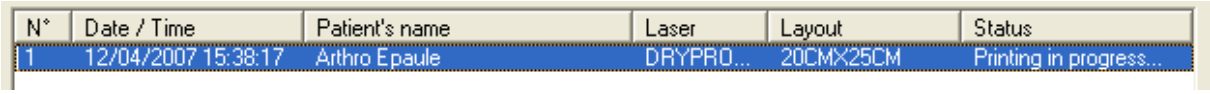
	Re-display the film in the viewer.
	Reprint the selection.
	Delete the selection from the list.
	Delete all films from the list.
	Close the window.

Each line displays the film status :

- The print is ***Spooled*** before starting to print.

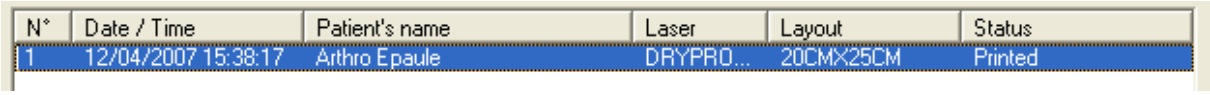


- The status changes during printing: ***Printing***.



N°	Date / Time	Patient's name	Laser	Layout	Status
1	12/04/2007 15:38:17	Arthro Epaule	DRYPRO...	20CMX25CM	Printing in progress...

- ***Printed*** is displayed once the job has been transferred to the laser printer.



N°	Date / Time	Patient's name	Laser	Layout	Status
1	12/04/2007 15:38:17	Arthro Epaule	DRYPRO...	20CMX25CM	Printed

Warning : If printing fails, the status column indicates the error, for example: ***Error in establishing a connection***. There is the option of starting a new print job by selecting the films to be printed and then clicking on the Reprint button. All or some of the films on the waiting list may also be deleted.

Warning : The printed status means that the film has been well transmitted to the laser. It does not mean that the film is ready to be picked.

37.11 Finding out if an image has been printed

To find out if an image has been printed, look to see if the image contains the print icon.

Image not printed	Image printed

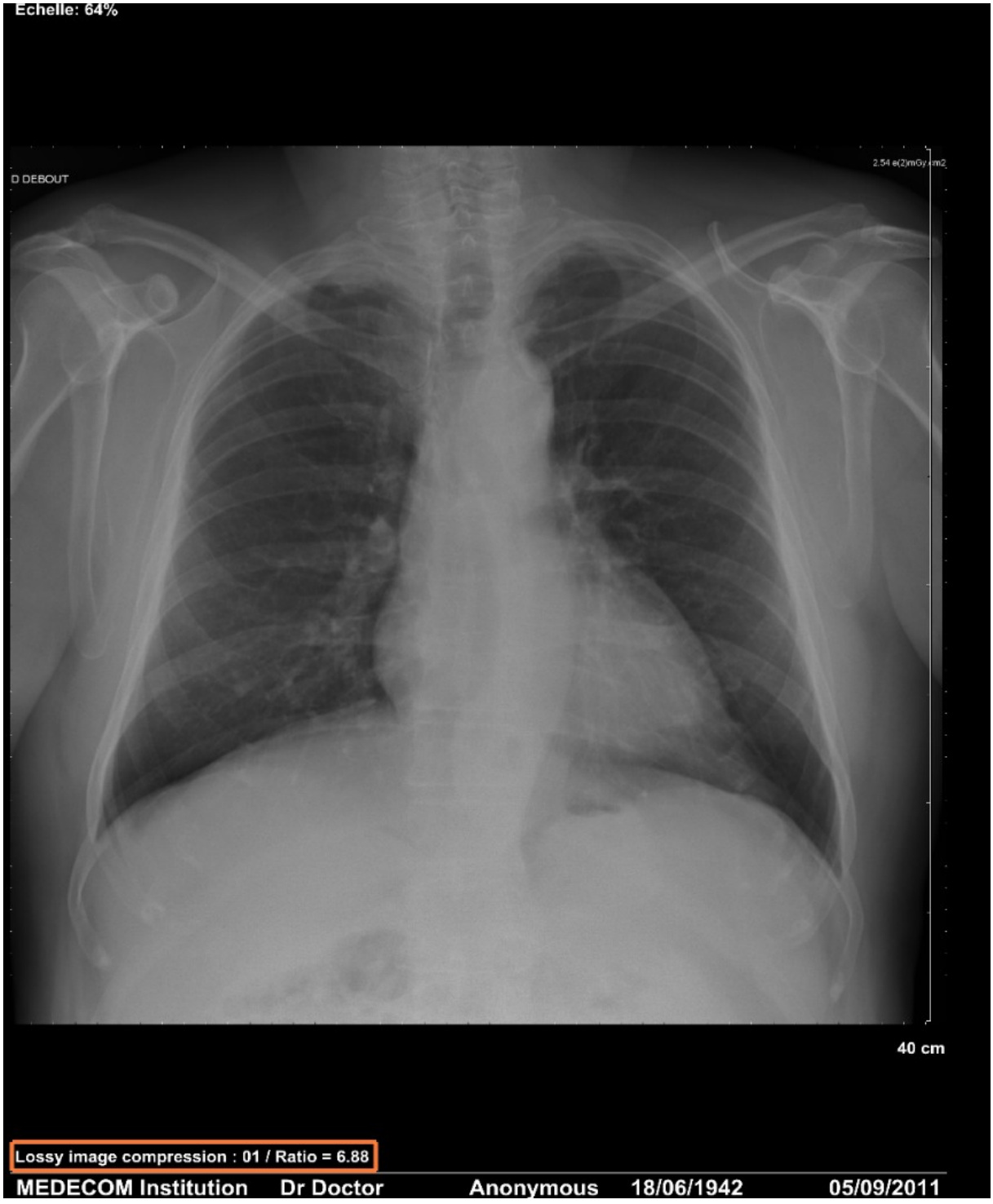
37.12 Information printed on film

On each film a stamp is printed with some indications about the patient, the study, the institution.

Warning :

- If the images are coming from the same study, only one stamp will be added for the whole film.
- If the images are coming from different studies (even the same patient), each image will have a stamp.

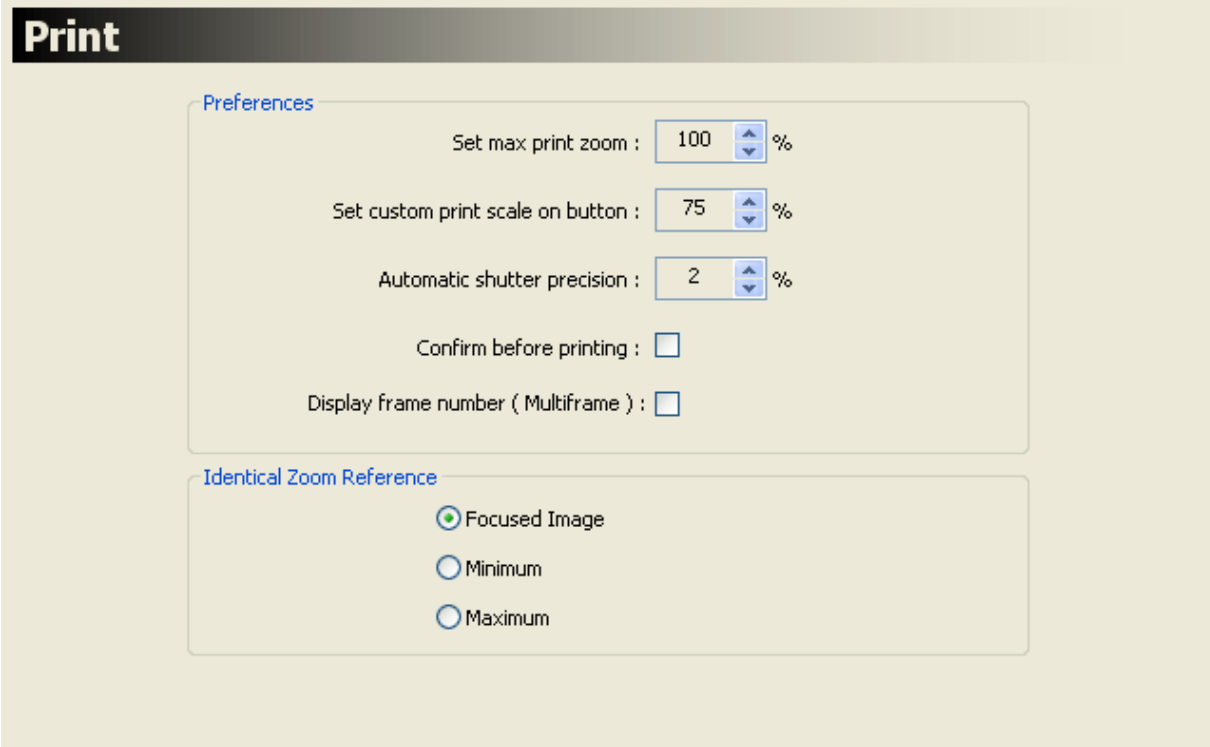
Additional information can also be printed for each image, to display for example acquisition parameters such as entrance dose. If the image has been compressed at a point in its lifetime with a lossy algorithm, and if corresponding information is found in the DICOM file, a text 'Lossy image compression : 01' and the corresponding ratio compression is printed on the film, as shown on the film below. If the image was not lossy compressed the text 'Lossy image compression : 00' could be printed.



The content, the position and the style of the stamp can be modified by the technician during the installation. However if image was compressed corresponding information is always printed.

37.13 Configuration

Press F8 key or go to menu Options/Configuration



- You can define the max print zoom (default value is 100%)
- User zoom is not used
- auto shutter precision can used for adjusting the auto shutter sensibility regarding the images
- Check the box to display the confirmation printing dialog.
- Display the sequence image number when preparing a print
- Zoom used when clicking on

Lasers and Windows printers configuration is for authorized people only.

38 Creating a Layout template [OPTION]

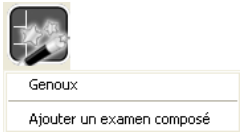
38.1 Creating a new layout template

Layout templates allow numerous repetitive tasks to be speeded up during film formatting.
They operate like a macro or a script.
To save a layout template, start by opening a study which will be a reference study. Perform all the usual actions with this study:

- Layout selection,
- Format selection,
- Addition of annotations,
- Adjusting scales and diaphragm,
- …

Once all of the actions have been carried out, save the layout template by clicking on , and click on **Add a layout template**. The dialog box opens allowing the name of the layout template to be entered :

38.2 Applying a layout template

Click on to display the list of available layout templates : 

.

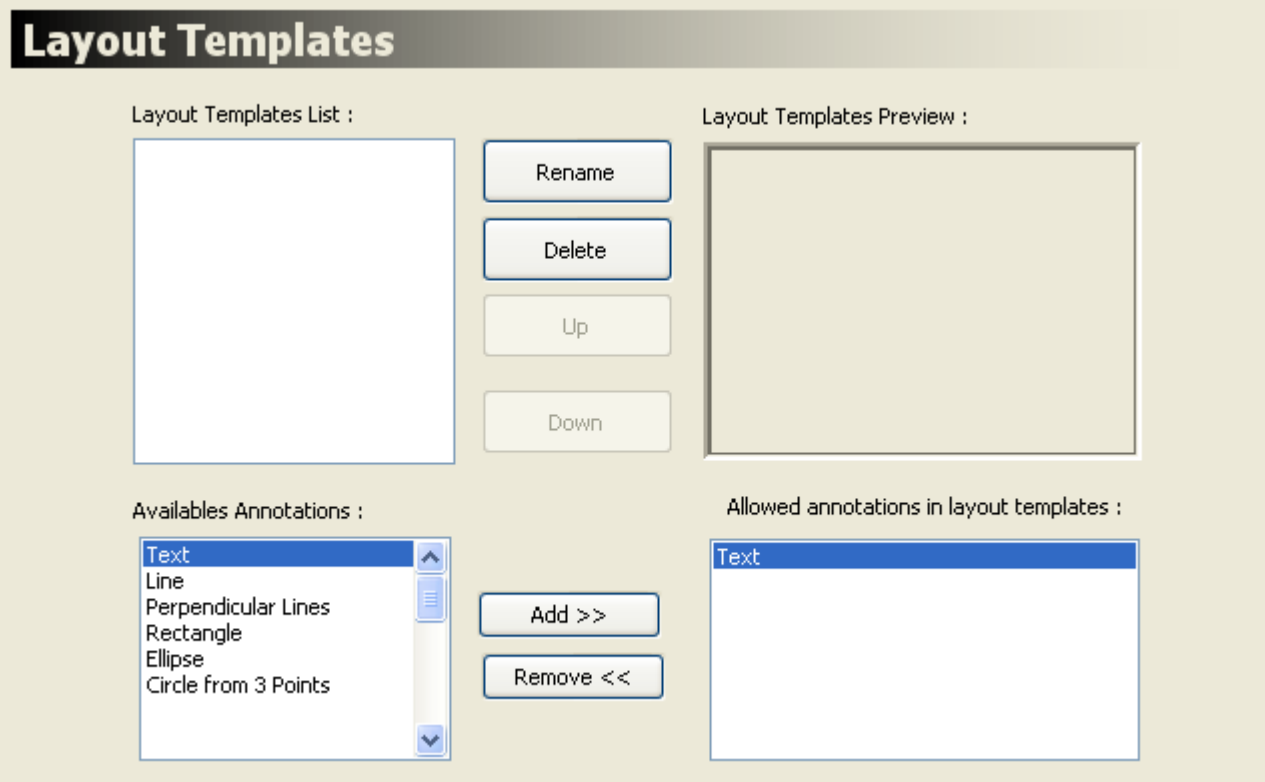
Warning : As the template does not take into account the location of the images, it is necessary to pre-position the images before applying the template.

38.3 Annotations

Regarding the configuration of the layout template, annotations can be added. By default only text annotation is set.
To set the annotations, go to the layout template configuration page.

38.4 Configuration

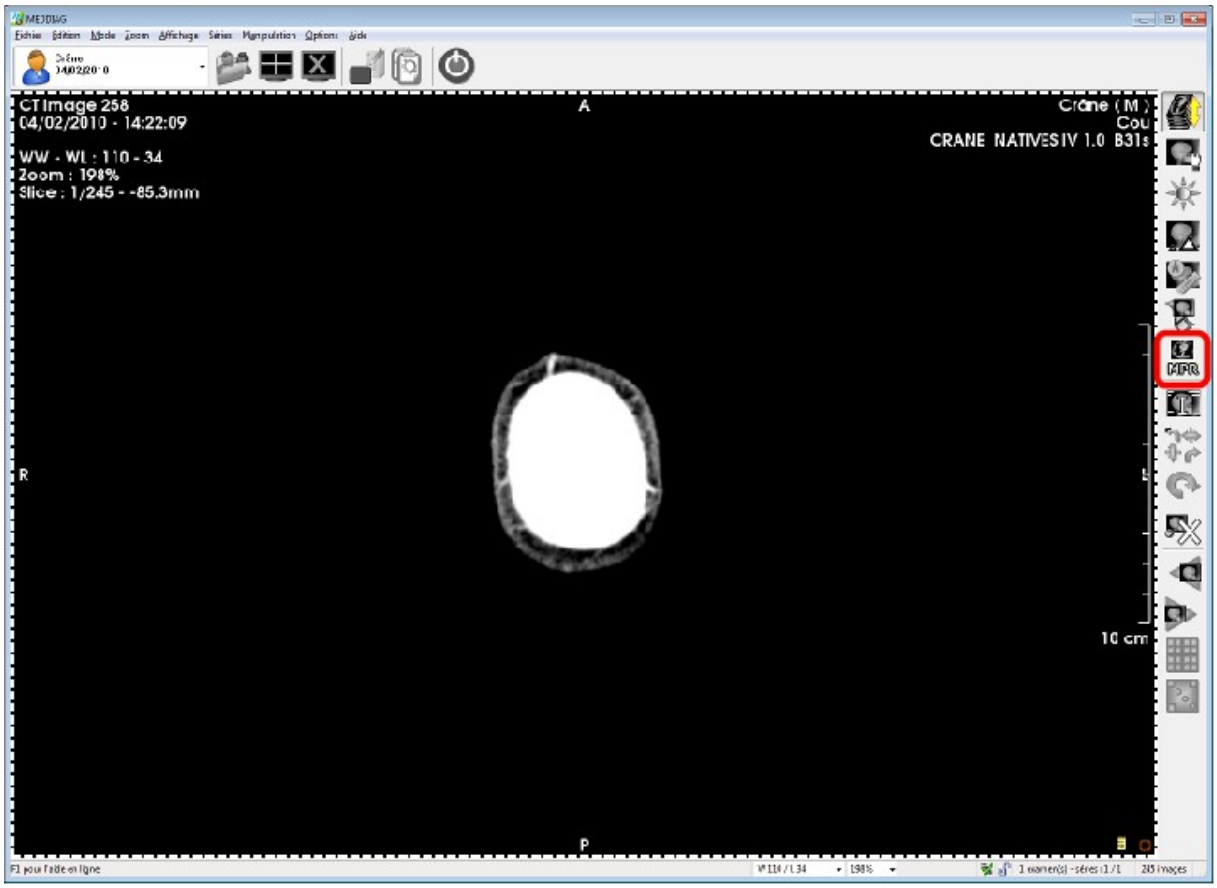
Press F8 or go to menu Options/Configuration



- You can delete, rename and sort layout templates
- You can add or remove visible annotations in the layout template.

39 MPR Module[OPTION]

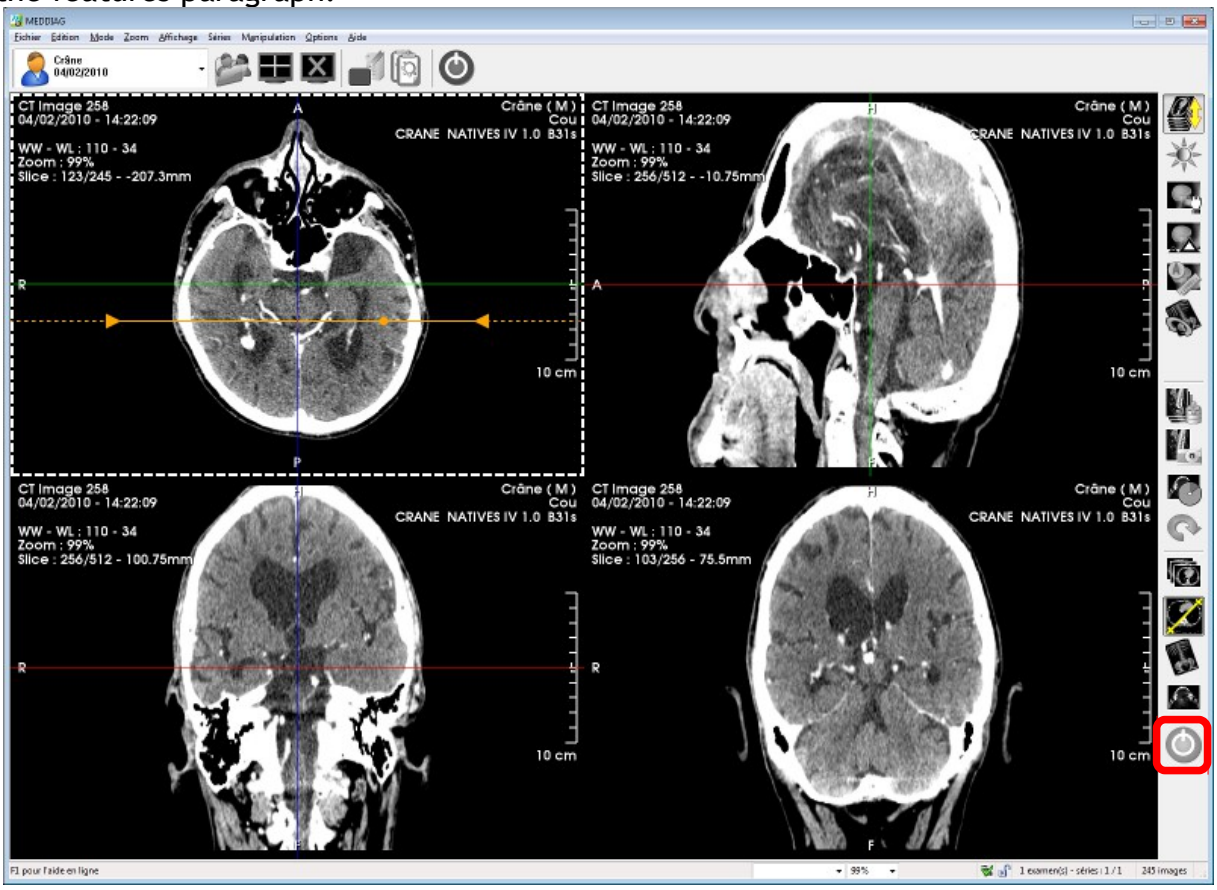
Switching to the MPR mode is available for CT/MR studies. You have to click on the MPR button, as shown in the following screenshot :



MPR interface is activated you'll have an access on the different features of MPR.

39.1 MPR GUI

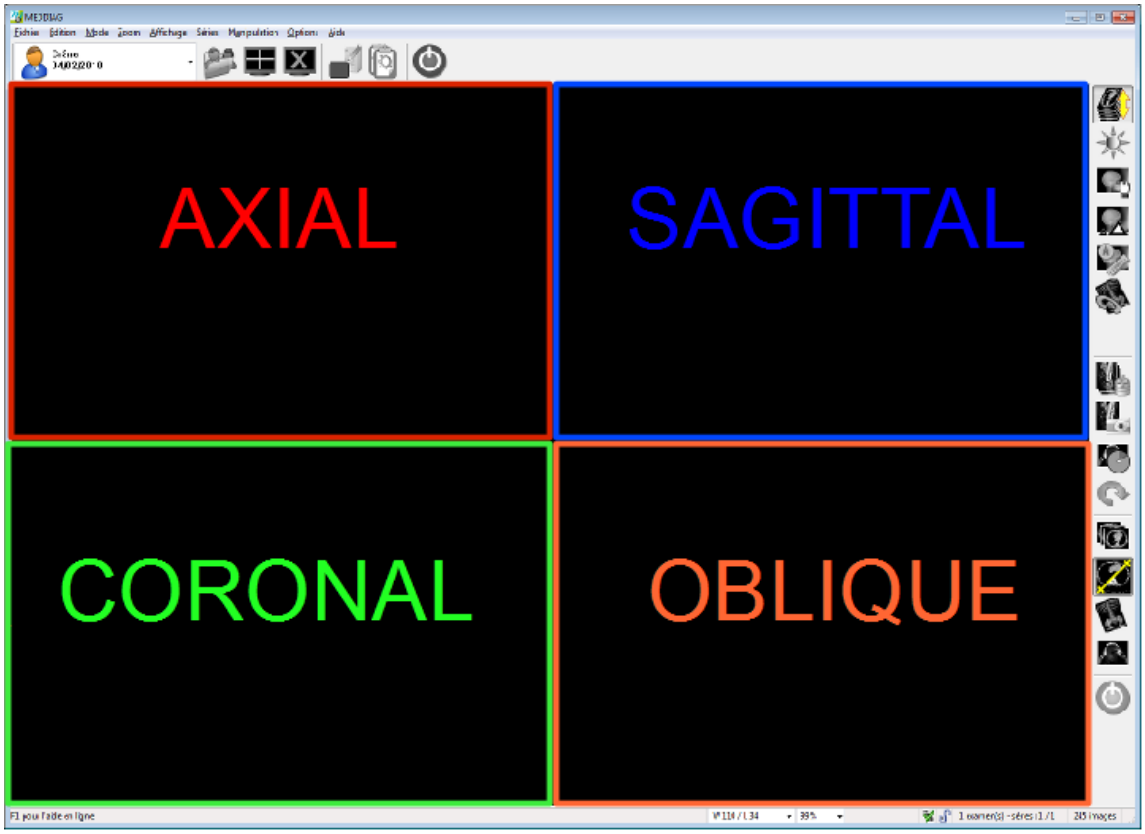
The MPR interface allows you to do several operation on the volume. To switch to the normal view you have to click on the Exit button. The different features are explained in the features paragraph.


CT Image 258
04/02/2010 - 14:22:09
WW - WL : 110 - 34
Zoom : 99%
Slice : 123/245 - -207.3mm
Crâne (M)
CRANE NATIVES IV 1.0 B31s
10 cm
CT Image 258
04/02/2010 - 14:22:09
WW - WL : 110 - 34
Zoom : 99%
Slice : 256/512 - -10.75mm
Crâne (M)
CRANE NATIVES IV 1.0 B31s
10 cm
CT Image 258
04/02/2010 - 14:22:09
WW - WL : 110 - 34
Zoom : 99%
Slice : 256/512 - 100.75mm
Crâne (M)
CRANE NATIVES IV 1.0 B31s
10 cm
CT Image 258
04/02/2010 - 14:22:09
WW - WL : 110 - 34
Zoom : 99%
Slice : 103/256 - 75.5mm
Crâne (M)
CRANE NATIVES IV 1.0 B31s
10 cm

Several viewing mode to visualize the reconstruct volume are available.

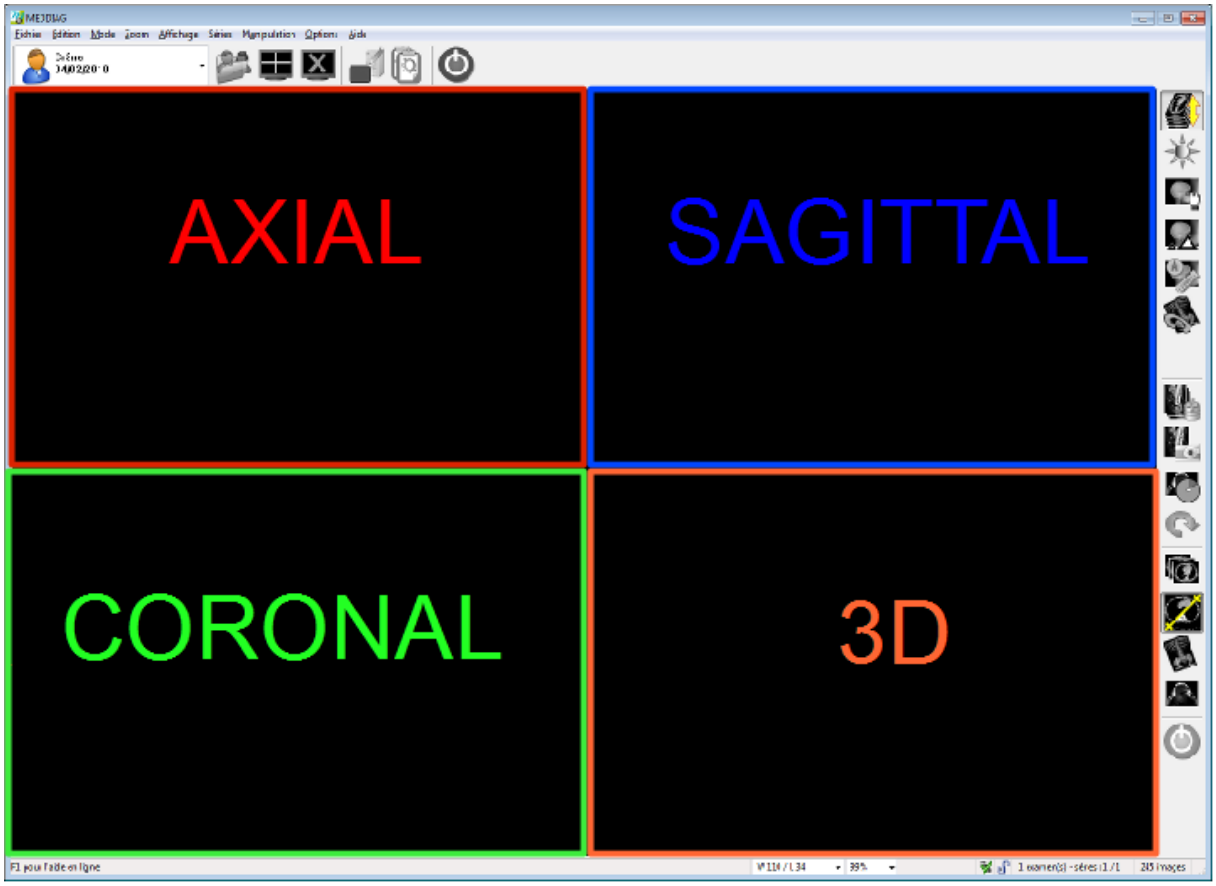
39.1.1 Oblique mode

Oblique mode allows you to cut trough volume with an angle different that standard views.



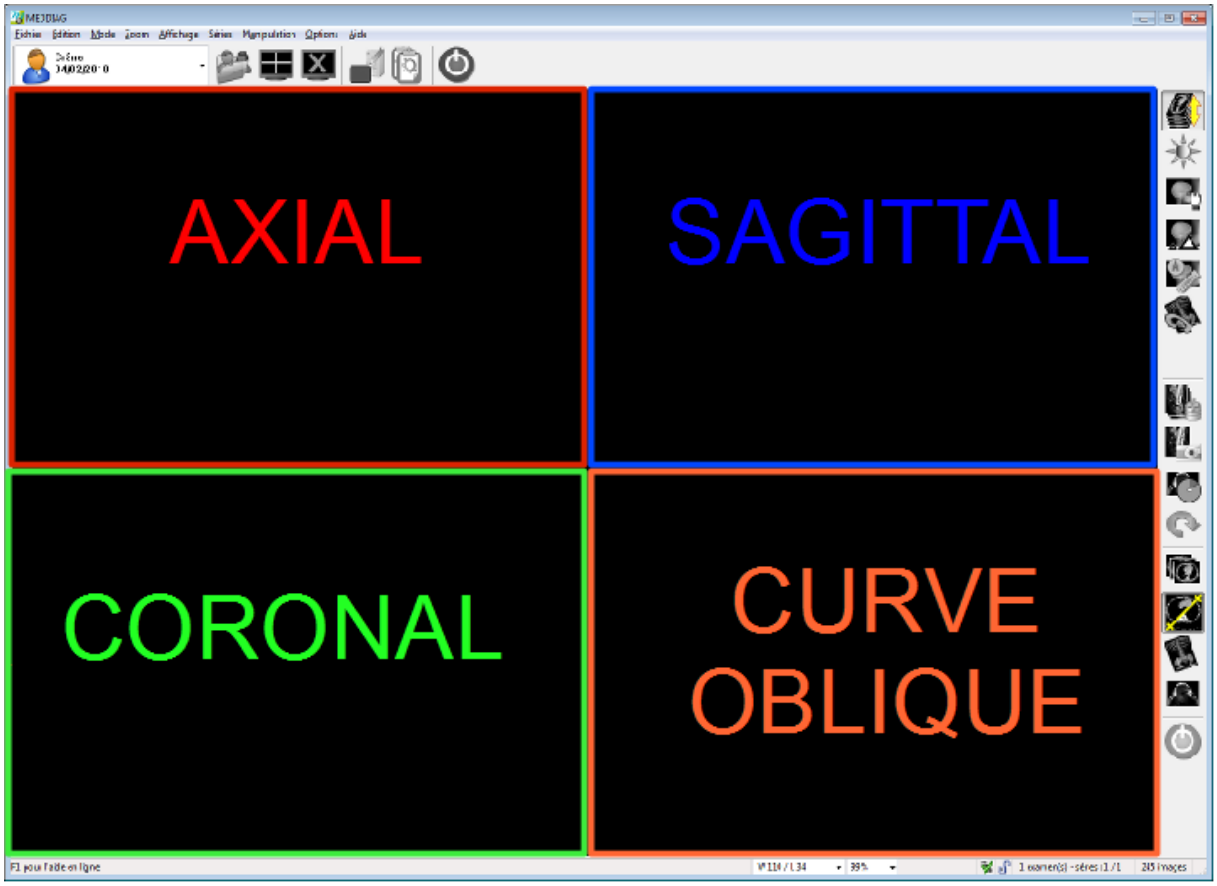
39.2 3D volume mode

3D volume mode allows you to visualize a study like a 3D volume with different rendering.



39.2.1 Curve mode

Curve mode allows you to define a curve reconstruction.



39.2.2 Panoramic mode

Panoramic module allows you to visualize a curve reconstruction.

ORIGINALE
OBLIQUE
PANO

40 Features

MPR features are described in the following paragraph. .

40.1 MPR Module icons

	3D Navigation
	Export several images.
	Export current view
	Curve reconstruction
	Oblique view.
	3D view
	Define curve points

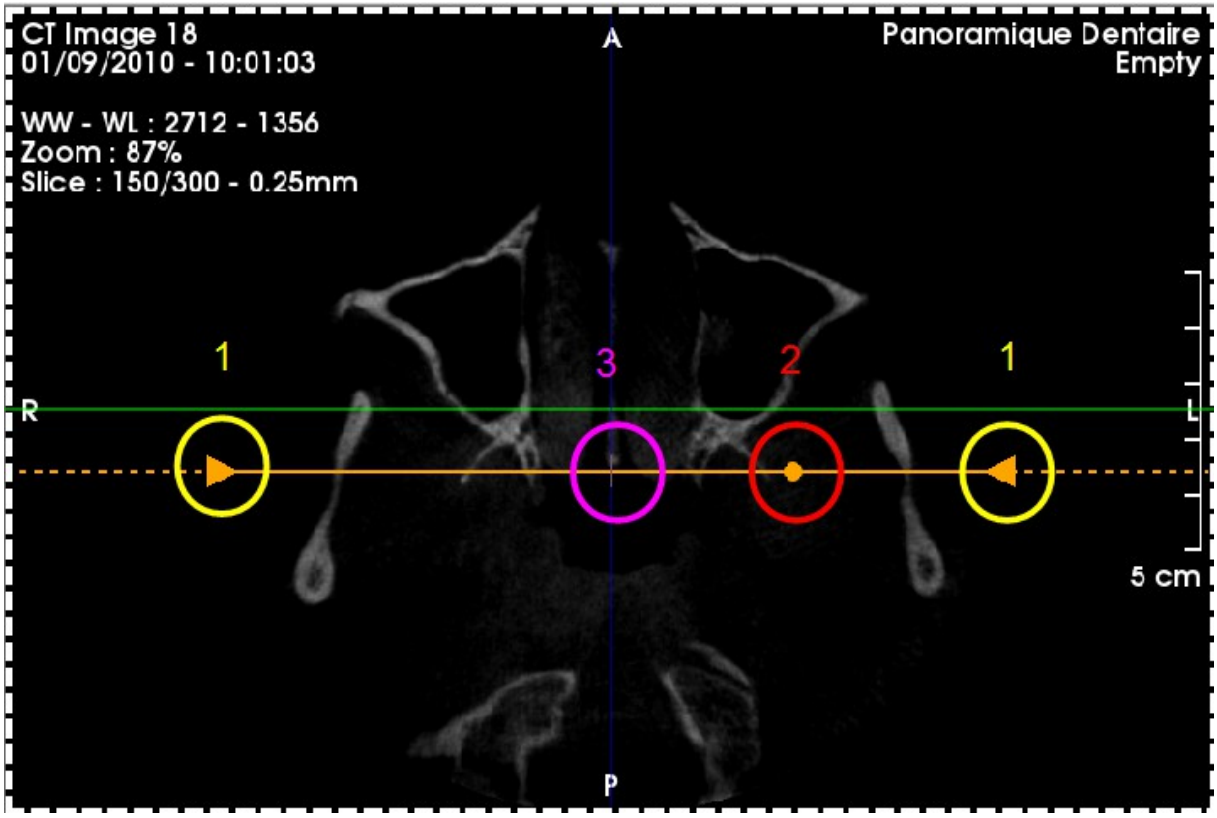
40.2 Define cursor 2D

Cursor 2D allow to move into the reconstruct volume. Those cursor follows a color conception :

- Red: axial view
- Blue : sagittal view
- Green: coronal view

40.3 Define Oblique

The oblique could be defined into three view (axial, coronal, sagittal). To do it you have to right click on the wanted view.



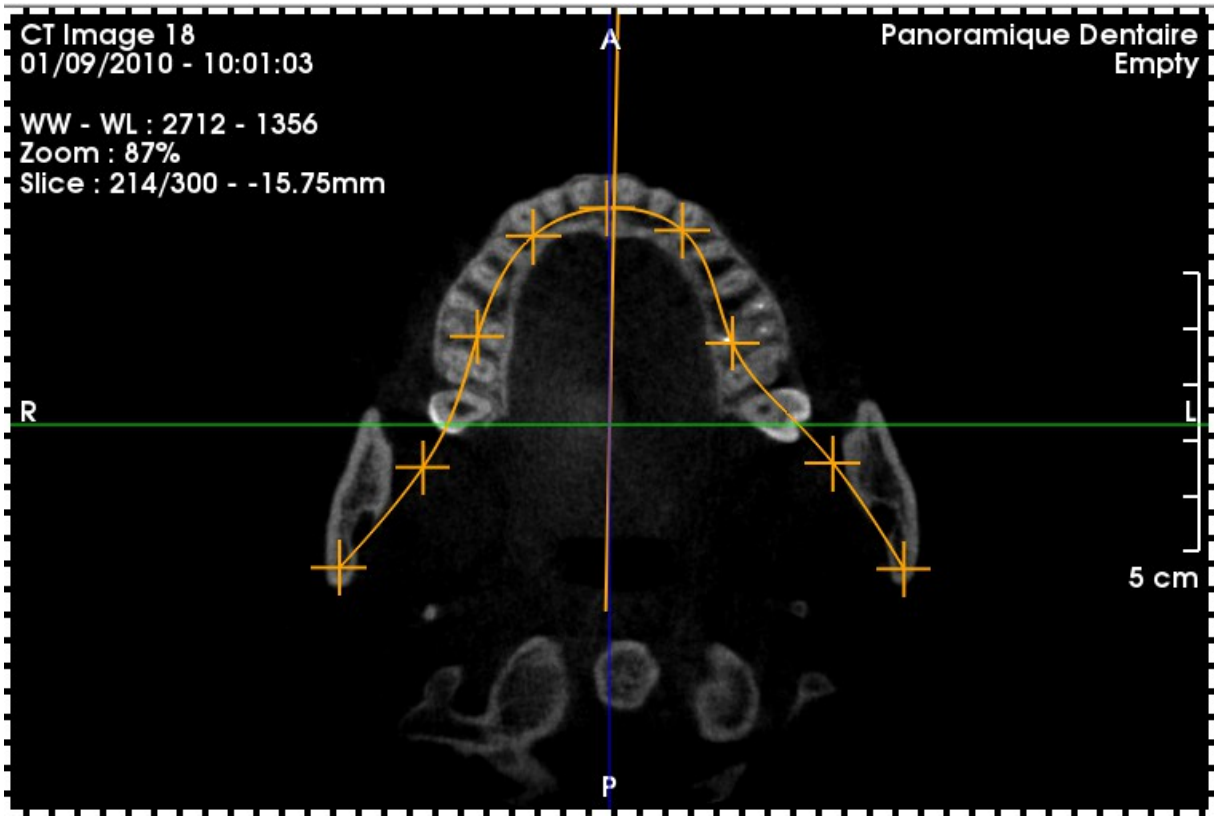
You can :

- Define oblique length thanks to the oblique ends. (1)
- Define rotation angle thanks to the angle controller (2).
- Define oblique position thanks to the oblique center (3).
- It's possible to navigate to a perpendicular way of the oblique thanks to the oblique.
- Export images parallel to the oblique thanks to the action button « Export several images. ».

For all these actions oblique view is modified.

40.4 Define a Curve

A curve could be defined into three view (axial, coronal, sagittal). To do it you have to right click on the wanted view to define first point of the curve. The other points have to be defined and you finalize the curve with a double-click.

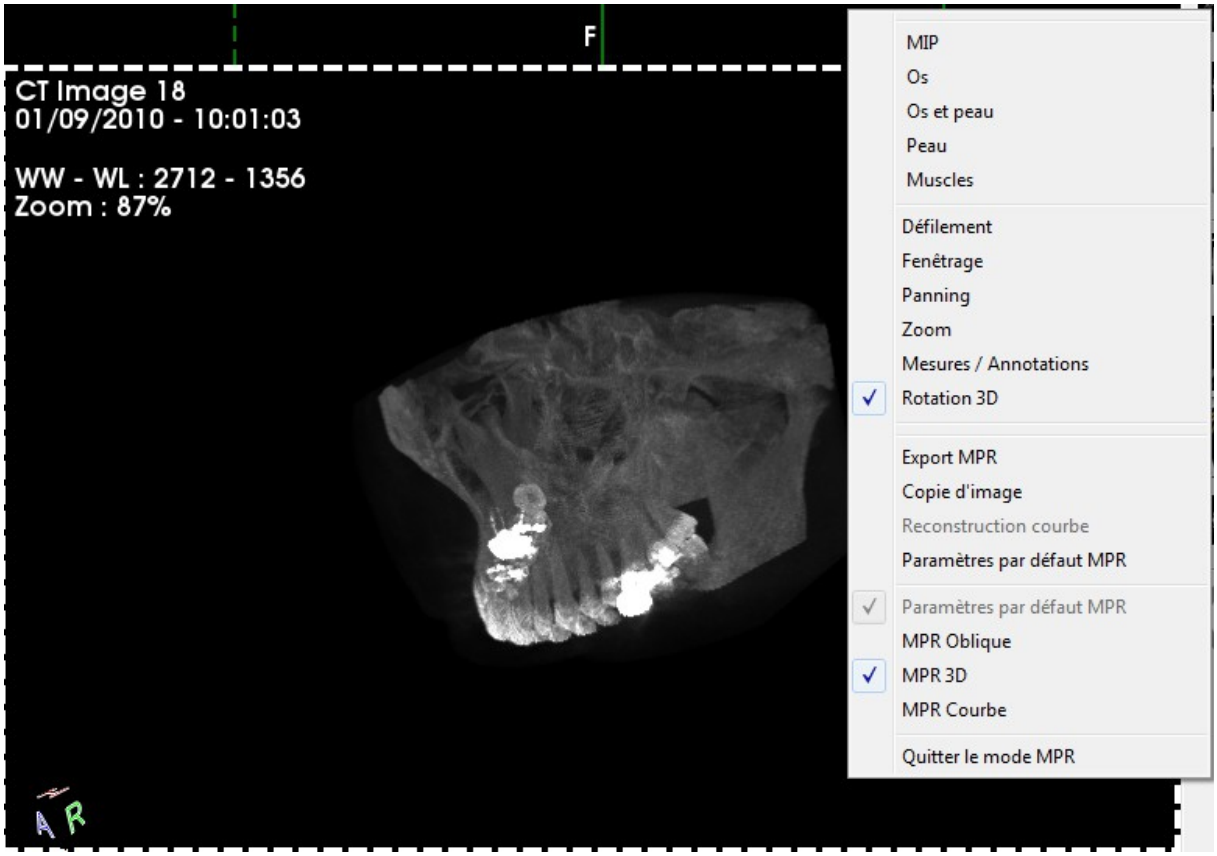


You can :

- Modify definition point on acting on them.
- Modify curve normal position on acting on the center of its center.
- Delete curve with double-clicked on it.
- Create the panoramic thanks to the action button « Curve reconstruction »

40.5 Volume Definition

3D mode allows to have a global view of the volume. To visualize it, 3D mode is needed.



You can display several volume projection result :

- MIP (minimum intensity projection)
- Bones (false color mapping to highlight bones)
- Bones and skin (false color mapping to highlight bones and skin)
- Skin (false color mapping to highlight skin)
- Muscles (false color mapping to highlight muscles)

You can decrease reconstruction volume area with 2D cursors.

40.6 Panoramic definition

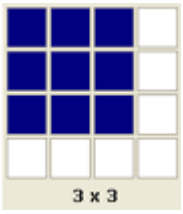
Panoramic mode allow you to reconstruction a planar volume. To do it a curve is needed.
You can :

- Navigate in the reconstruct volume
- Export panoramic thanks to the action button « Export current view ».

41 Comparing images from different studies

41.1 Comparing different studies

Studies may be compared at any time by using the examination comparison function.

This mode is activated by clicking on , the following window opens 

. The series number to be simultaneously displayed on the screen may be selected.

The maximum number of studies displayed is specified in the configuration options.

Using mode, the location of the series may be changed.

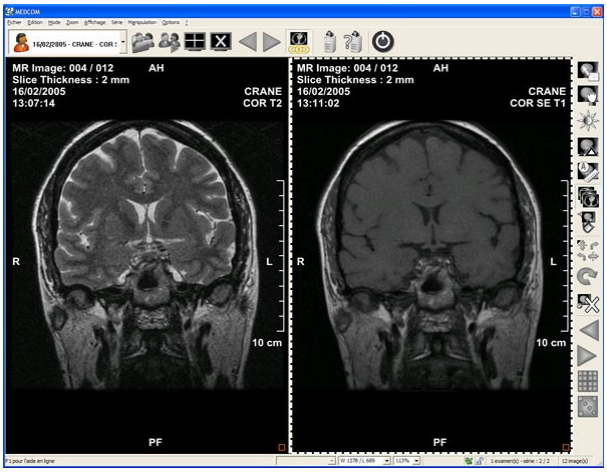
Example of the display in multi-series mode:

Moving from one series to another is possible by clicking on or the opened series which are not displayed are then shown. To close a series, click on .Up to 6 examinations may be open at the same time (See options).

41.2 Comparing two CT/MR series

The comparison mode also allows two CT or MR series to be compared (according to the options). By clicking on , the synchronisation of the two series is activated depending on the position of the slices.
Moreover, all zoom actions, windows, panning, number of images displayed for one series shall be automatically applied to the other synchronised series.

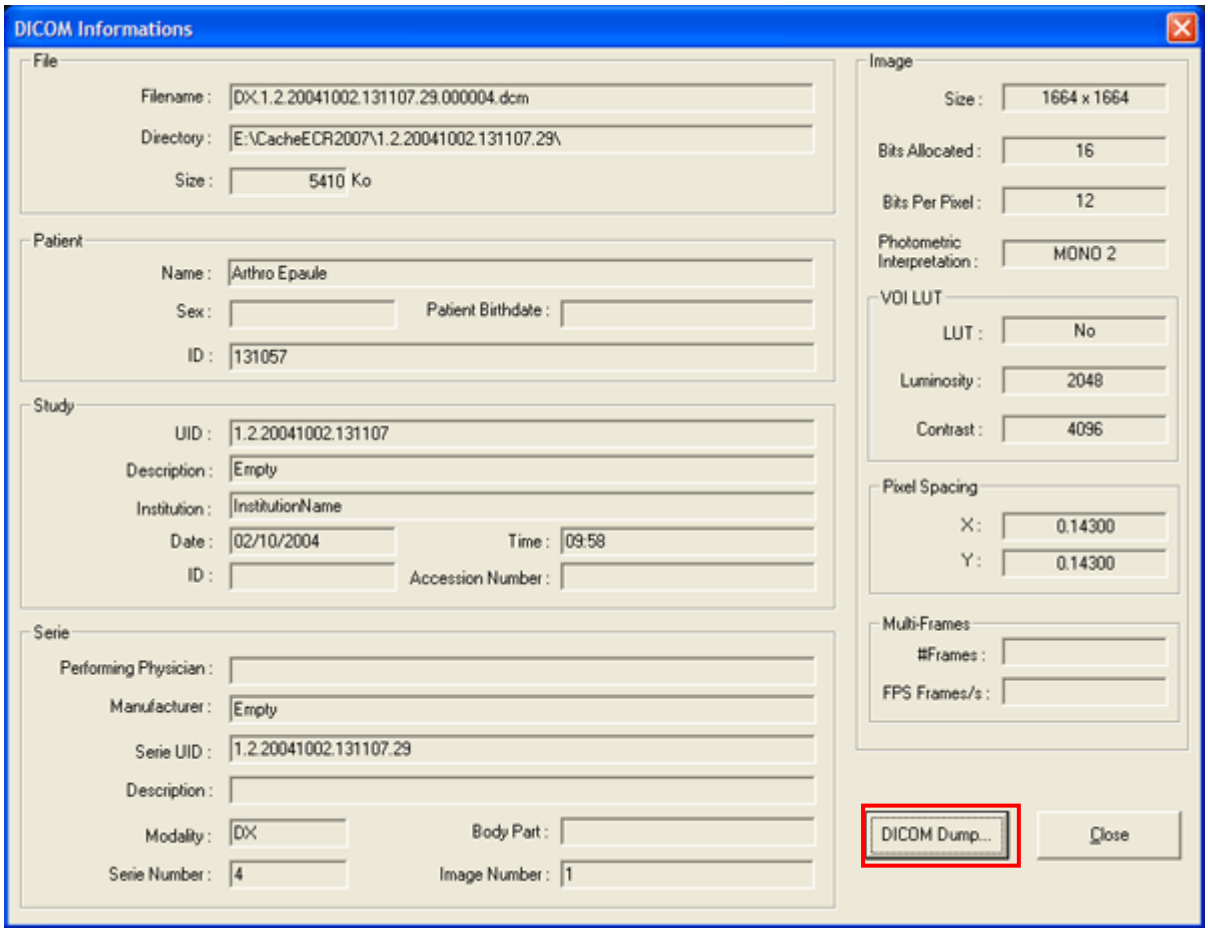
Only two series may be synchronised at the same time.



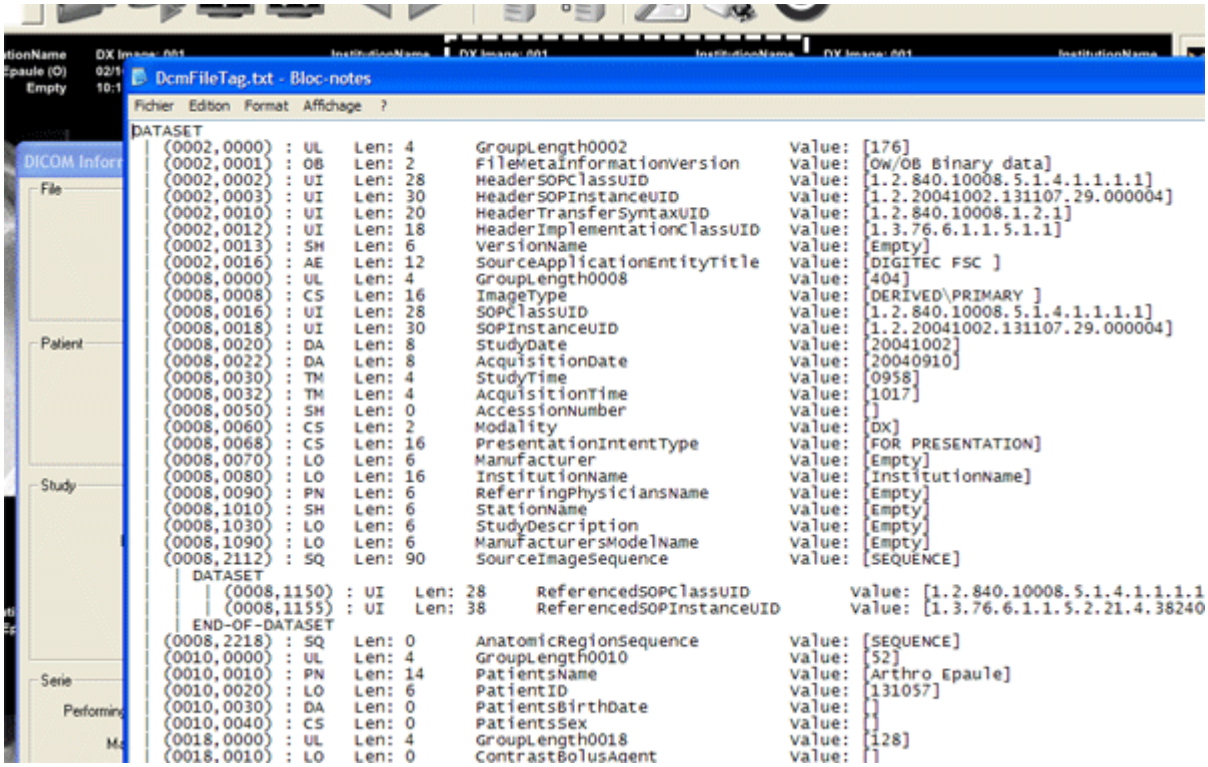
42 Displaying DICOM information for an image

To display or hide information displayed on images, click on the Display menu, then on the Overlay menu.

To display DICOM fields for an image, press the F9 key or click on the Display menu, then on DICOM information menu… :
The DICOM information from the active image will be shown.



All DICOM fields in the file may be displayed by clicking on the DICOM field button... The text file display software appears with the list of DICOM fields:


DcmFileTag.txt - Bloc-notes
Fichier Edition Format Affichage ?
DATASET
(0002,0000) : UL Len: 4 GroupLength0002 Value: [176]
(0002,0001) : OB Len: 2 FileMetaInformationVersion Value: [OW/OB Binary data]
(0002,0002) : UI Len: 28 HeaderSOPClassUID Value: [1.2.840.10008.5.1.4.1.1.1.1]
(0002,0003) : UI Len: 30 HeaderSOPInstanceUID Value: [1.2.20041002.131107.29.000004]
(0002,0010) : UI Len: 20 HeaderTransferSyntaxUID Value: [1.2.840.10008.1.2.1]
(0002,0012) : UI Len: 18 HeaderImplementationClassUID Value: [1.3.76.6.1.1.5.1.1]
(0002,0013) : SH Len: 6 VersionName Value: [Empty]
(0002,0016) : AE Len: 12 SourceApplicationEntityTitle Value: [DIGITEC FSC]
(0008,0000) : UL Len: 4 GroupLength0008 Value: [404]
(0008,0008) : CS Len: 16 ImageType Value: [DERIVED\PRIMARY]
(0008,0016) : UI Len: 28 SOPClassUID Value: [1.2.840.10008.5.1.4.1.1.1.1]
(0008,0018) : UI Len: 30 SOPInstanceUID Value: [1.2.20041002.131107.29.000004]
(0008,0020) : DA Len: 8 StudyDate Value: [20041002]
(0008,0022) : DA Len: 8 AcquisitionDate Value: [20040910]
(0008,0030) : TM Len: 4 StudyTime Value: [0958]
(0008,0032) : TM Len: 4 AcquisitionTime Value: [1017]
(0008,0050) : SH Len: 0 AccessionNumber Value: []
(0008,0060) : CS Len: 2 Modality Value: [DX]
(0008,0068) : CS Len: 16 PresentationIntentType Value: [FOR PRESENTATION]
(0008,0070) : LO Len: 6 Manufacturer Value: [Empty]
(0008,0080) : LO Len: 16 InstitutionName Value: [InstitutionName]
(0008,0090) : PN Len: 6 ReferringPhysiciansName Value: [Empty]
(0008,1010) : SH Len: 6 StationName Value: [Empty]
(0008,1030) : LO Len: 6 StudyDescription Value: [Empty]
(0008,1090) : LO Len: 6 ManufacturersModelName Value: [Empty]
(0008,2112) : SQ Len: 90 SourceImageSequence Value: [SEQUENCE]
DATASET
(0008,1150) : UI Len: 28 ReferencedSOPClassUID Value: [1.2.840.10008.5.1.4.1.1.1.1
(0008,1155) : UI Len: 38 ReferencedSOPInstanceUID Value: [1.3.76.6.1.1.5.2.21.4.38240
END-OF-DATASET
(0008,2218) : SQ Len: 0 AnatomicRegionSequence Value: [SEQUENCE]
(0010,0000) : UL Len: 4 GroupLength0010 Value: [52]
(0010,0010) : PN Len: 14 PatientsName Value: [Arthro Epaule]
(0010,0020) : LO Len: 6 PatientID Value: [131057]
(0010,0030) : DA Len: 0 PatientsBirthDate Value: []
(0010,0040) : CS Len: 0 PatientsSex Value: []
(0018,0000) : UL Len: 4 GroupLength0018 Value: [128]
(0018,0010) : LO Len: 0 ContrastBolusAgent Value: []

43 Deleting one or more images

Select the images which are not to be displayed.

Then, either:

- Press the key or click on ,
- Select the Edit menu...Remove the selection

NB: This action does not delete images from the disk! It only removes the image from the display. First, select the images which are no longer to be displayed.

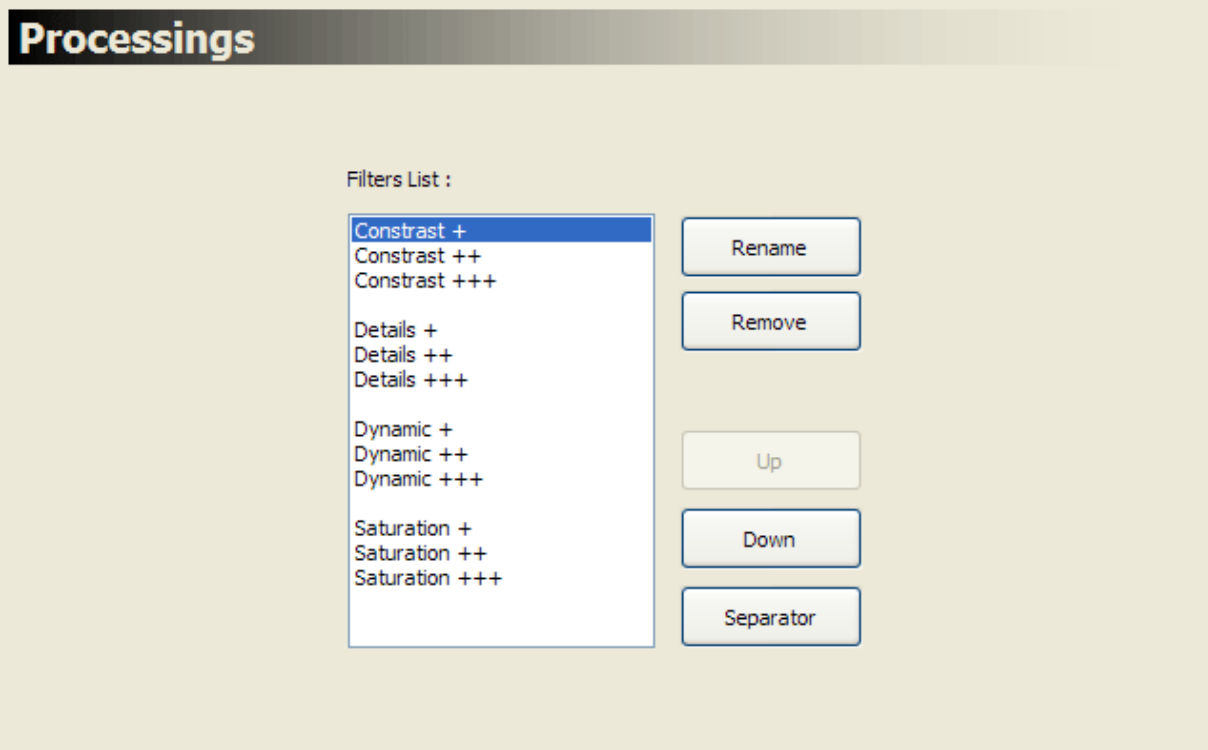
44 Setting the station

The options menu allows the simple and clear setting of all of the station's parameters.
Click on the options menu to open it then on options...
One section of the options is configurable by the user, the other section (maintenance) is not accessible by authorised persons.

44.1 Layout templates

See chapter on layout template

44.2 Processing



This option allows the processing to be managed:

- Add
- Modify
- Delete
- Order

44.3 Windowing

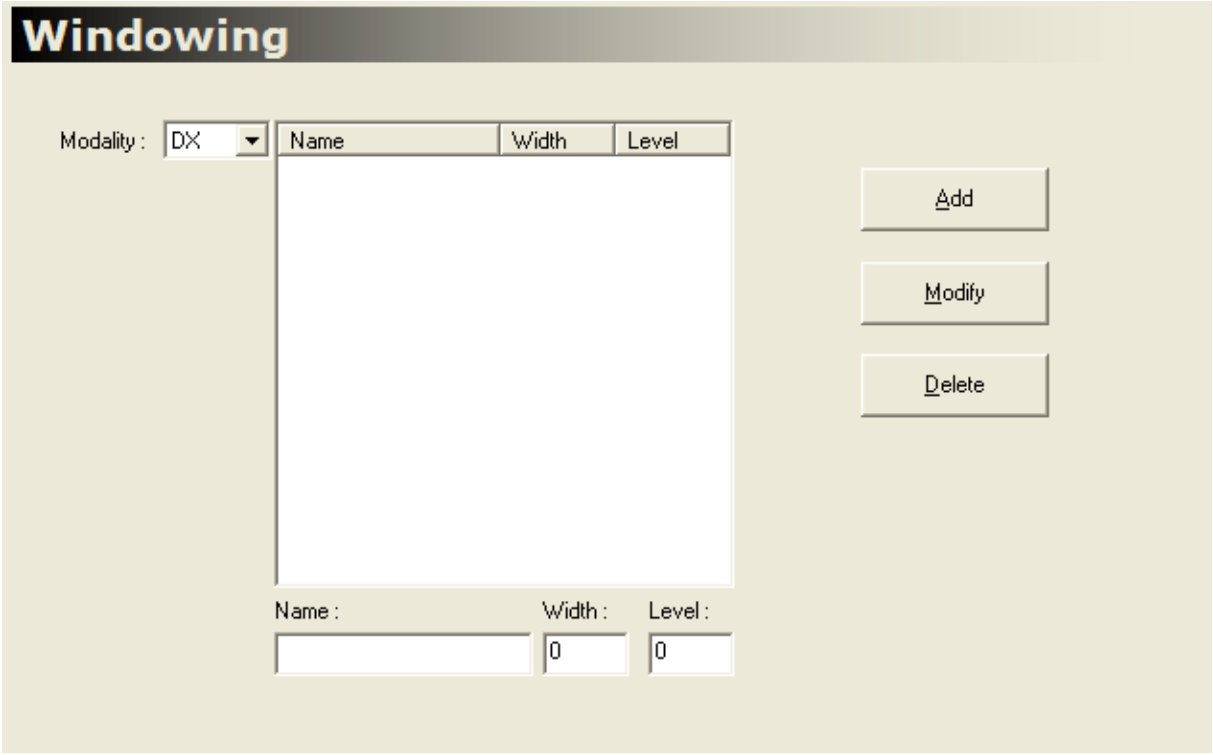
This option allows the contrast/brightness windows to be managed:

- Add
- Modify
- Delete

To add a new window,

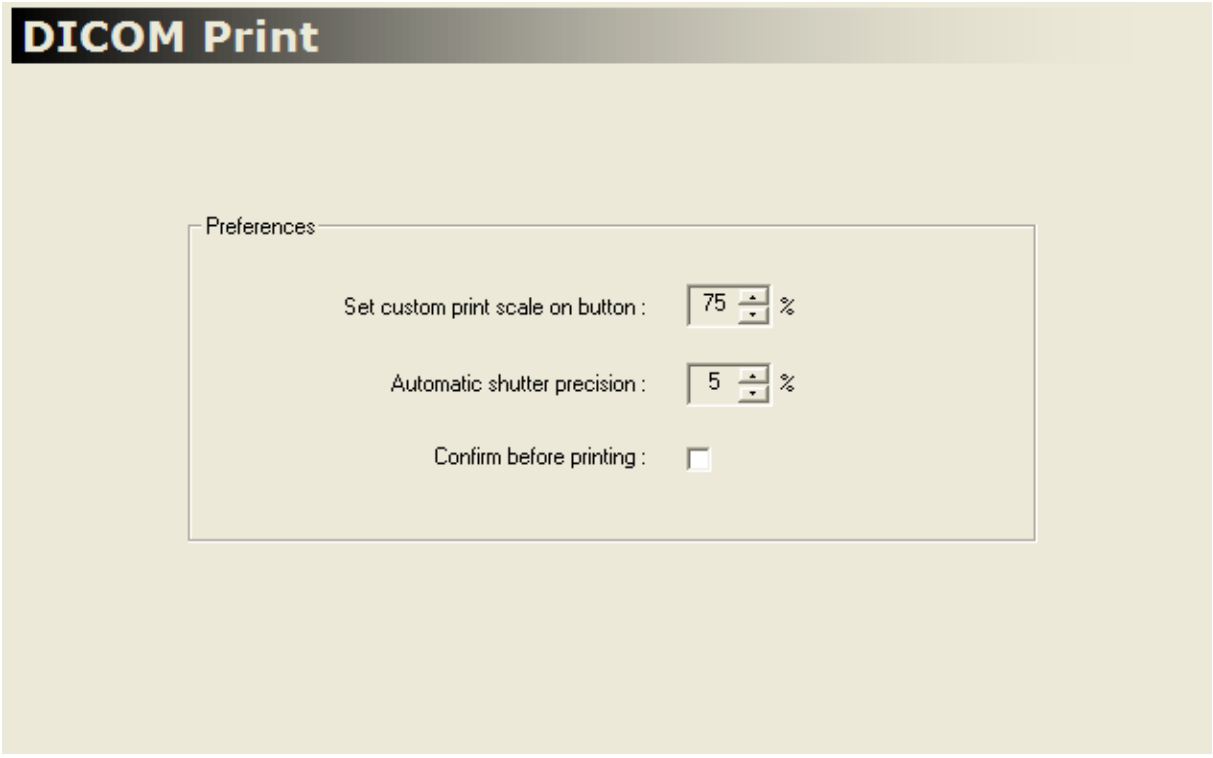
- specify its name (text)

- on which modality it is available
- its level and its width (numbers) and level.



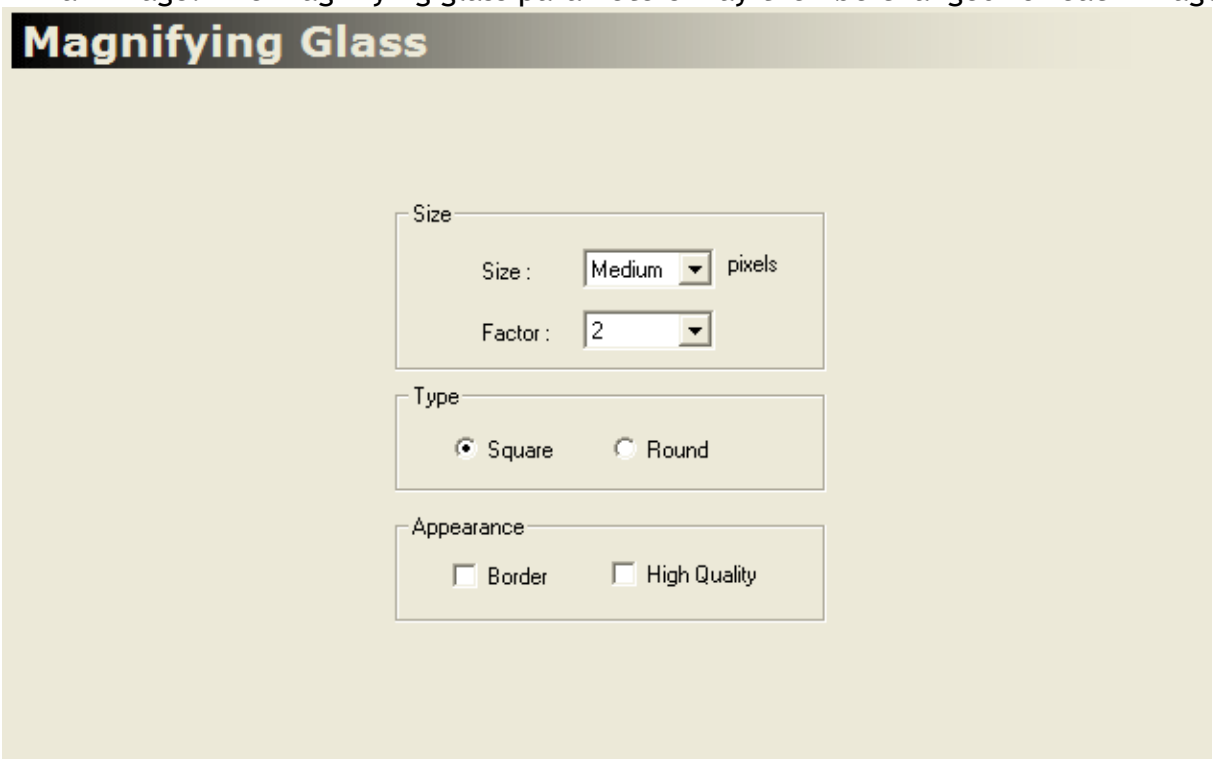
44.4 DICOM printing

- Adjusting the zoom of the printing.
- Adjusting the automatic shutter.
- The DICOM printing dialog box display may be selected.



44.5 Magnifying glass

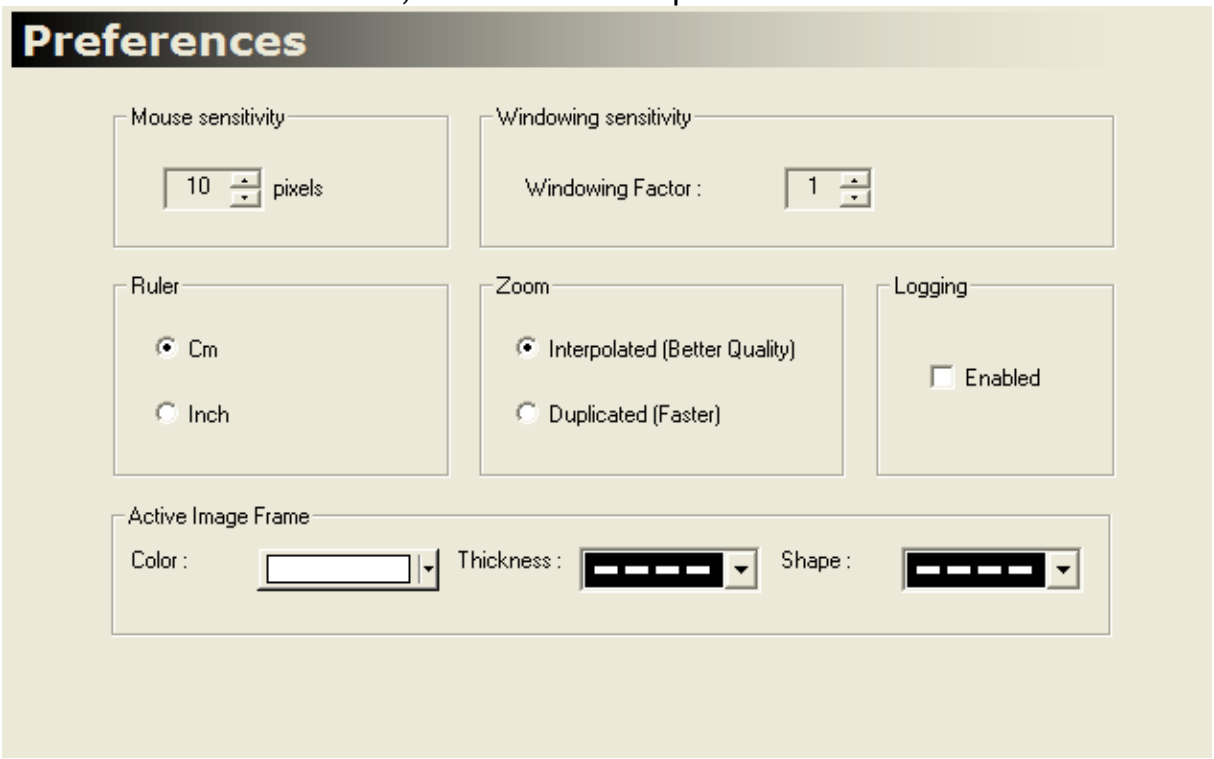
- Allows the default magnifying glass settings to be defined when it is first used on an image. The magnifying glass parameters may then be changed for each image.



44.6 Preferences

General options:

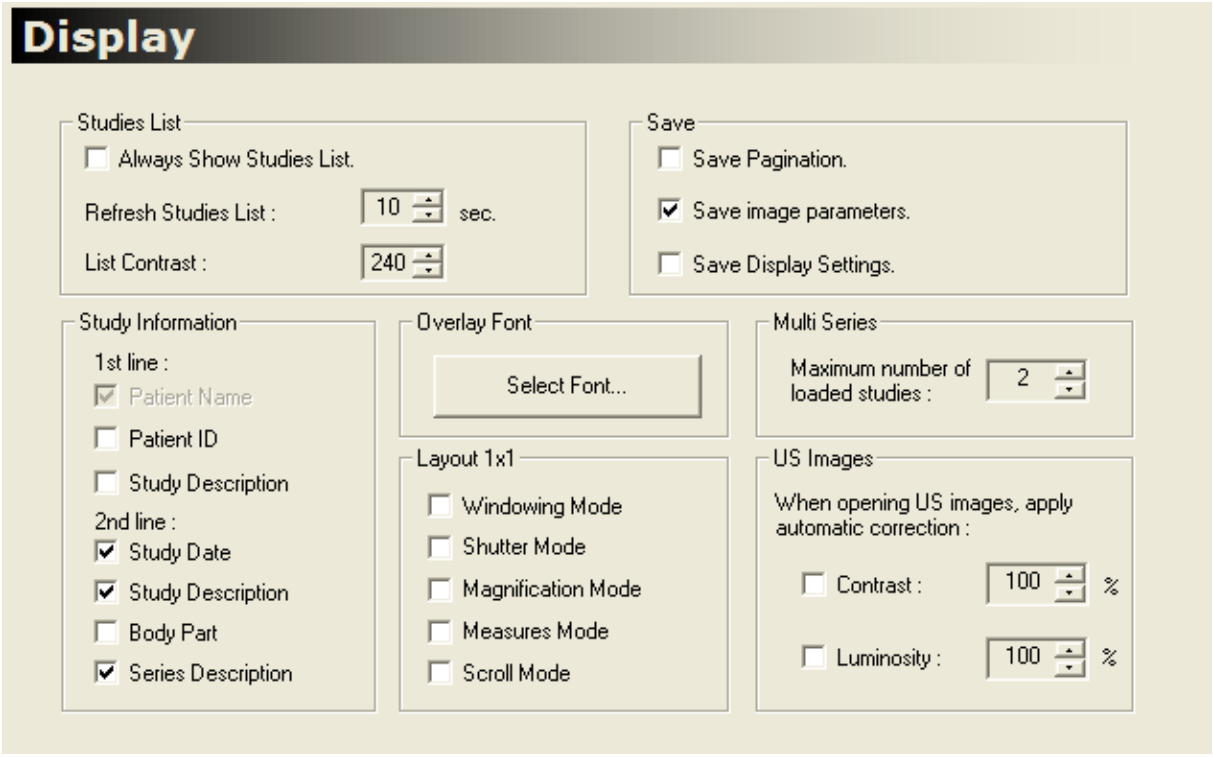
- Selecting the layout of the tool bars.
- Sensitivity of the mouse (to speed up or slow down window splitting for example).
- Activating the writing of the debugging file.
- Type of format for JPEG files and the associated quality factor (loss of information).
- Type of interpolation when enlarging or reducing images.
- Unit for the ruler.
- Authorisation to switch off the computer when the software is switched off.
- The active frame colour, thickness and shape



44.7 Display

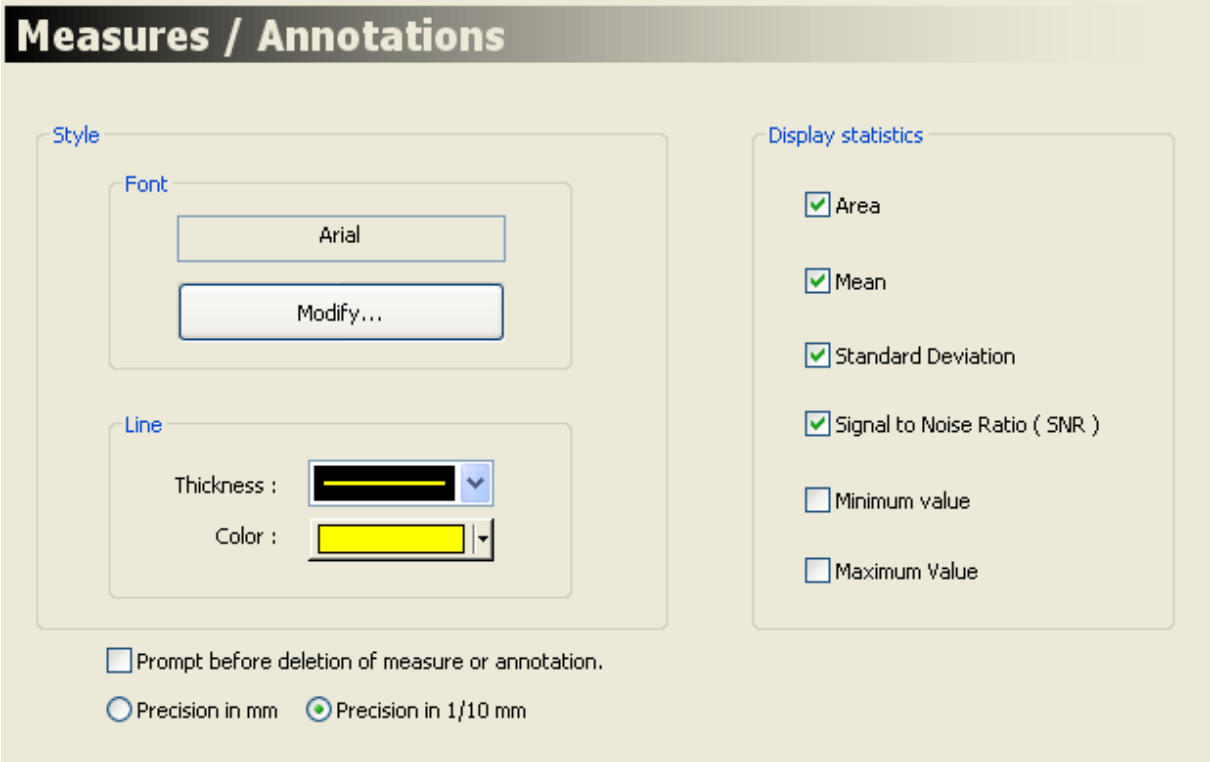
- List of examinations:
  - Adjusting the refresh speed of the list.
  - Adjusting the colour of one line on two (improved visibility on the list).
  - Recording image parameters (shutter, brightness, contrast...).
  - Recording page set up information (image layout and Viewer cut position).
  - List of studies which are always displayed (in the event of several monitors).
- Multi-series: of the maximum number of series open at the same time (1 to 6).
- Selection of the overlay font (displaying information around the image in the viewer).
- US specificity only used for ultra-sound images): allows the contrast and brightness to be automatically corrected for each US image.

- 1x1 format:
  - Specification of the tilt in 1x1 mode for the window splitting mode.
  - Specification of the tilt in 1x1 mode for the shutter mode.
  - Specification of the tilt in 1x1 mode for the magnifying glass mode.
  - Specification of the tilt in 1x1 mode for the measurement mode.



44.8 Measurements

- Selection of the font to be used for displaying measurement annotations on the screen.
- Activation de of the dialog box to confirm the deletion of the measurement annotations.
- Selection of the colour of the measurement annotations.
- Selection of the line thickness for the measurement annotations.
- Select Measure precision
- Select displayed statistics in the QA tool



44.9 Study List

Managing the study list columns:

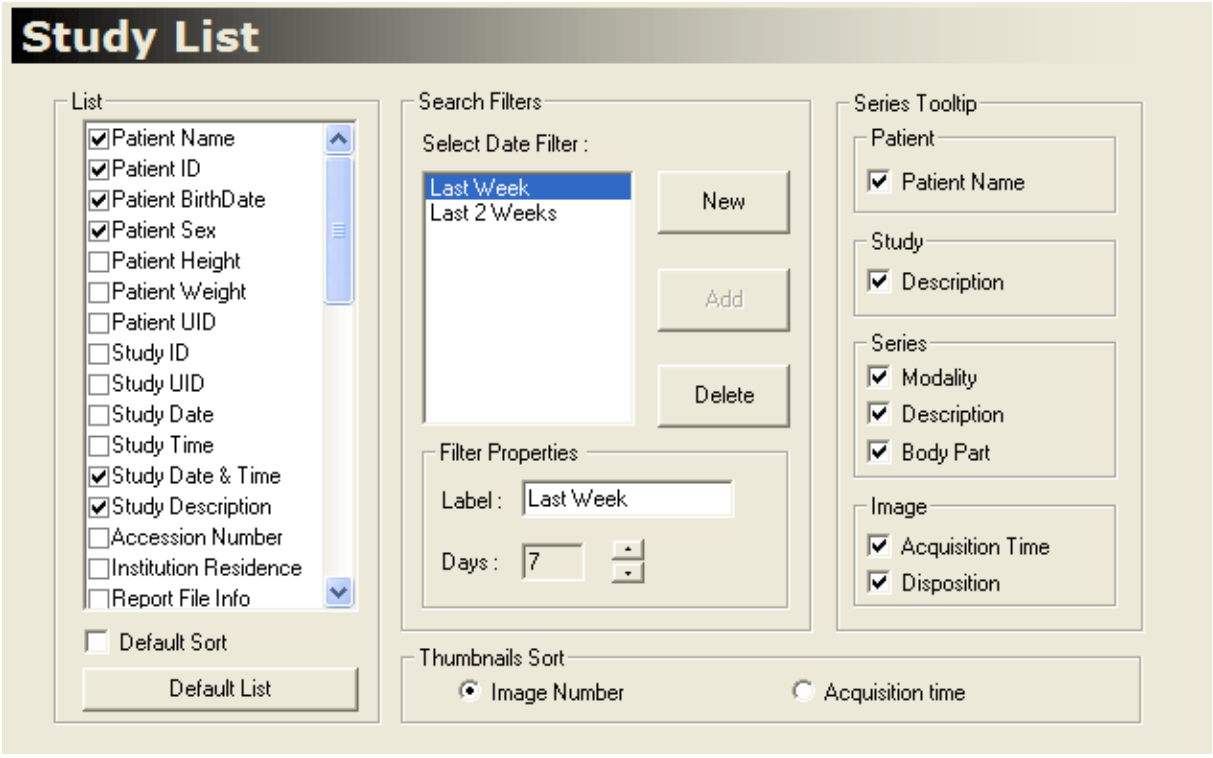
- Adding columns
- Deleting columns

Managing date filters:

- Adding filters
- Definition of the period
- Deleting filters

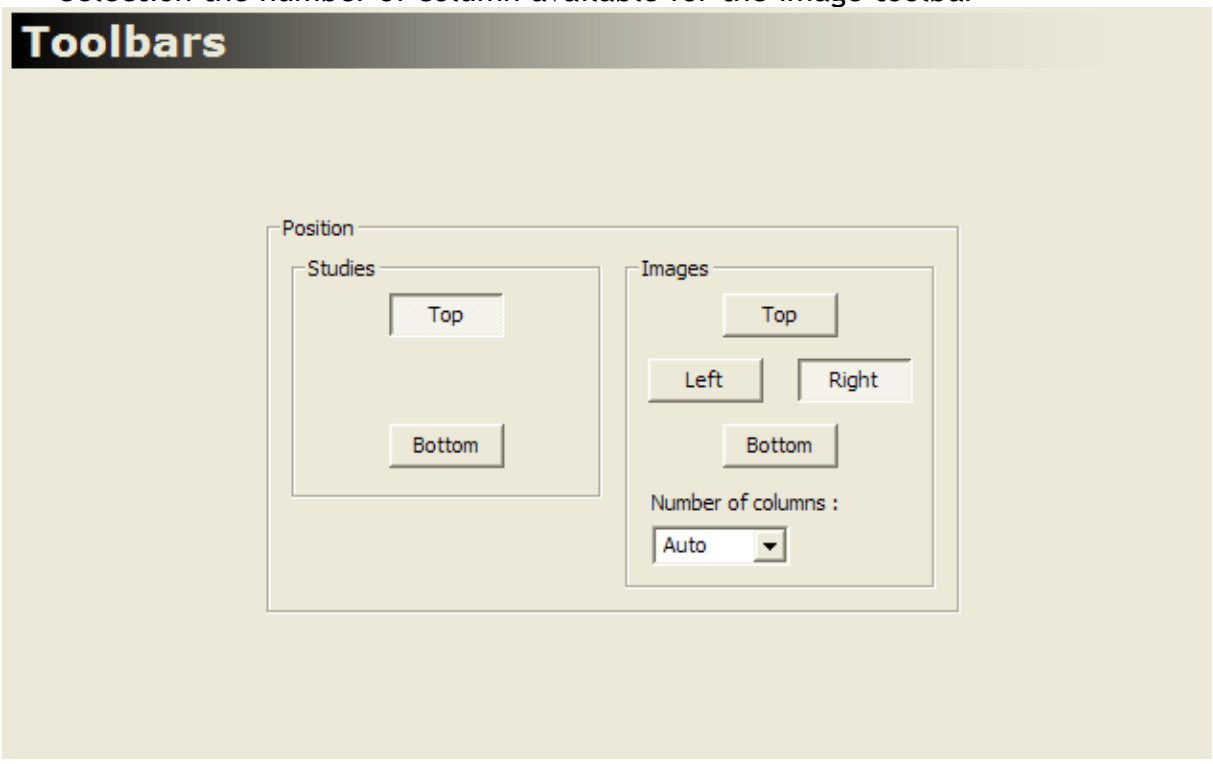
Managing the thumbnails list

- Content of the tooltips
- List sort order



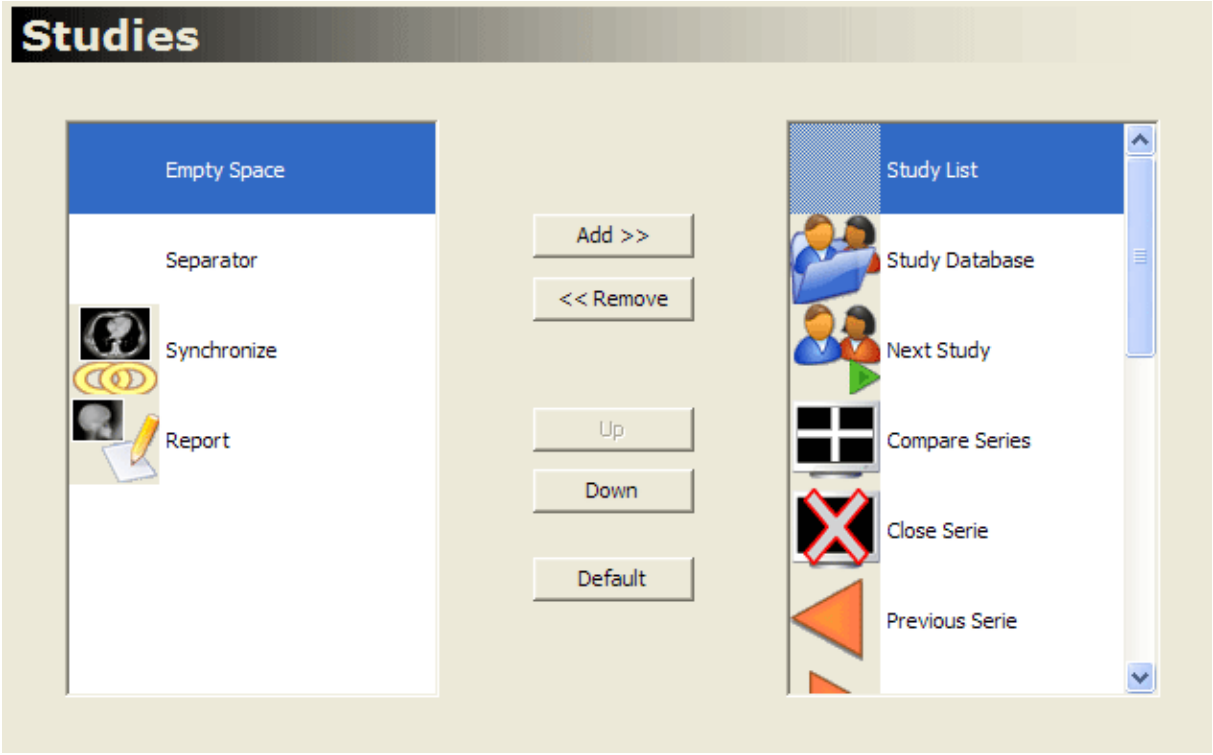
44.10 Toolbars

- Selecting the study toolbar position
- Selecting the image toolbar position
- Selection the number of column available for the image toolbar



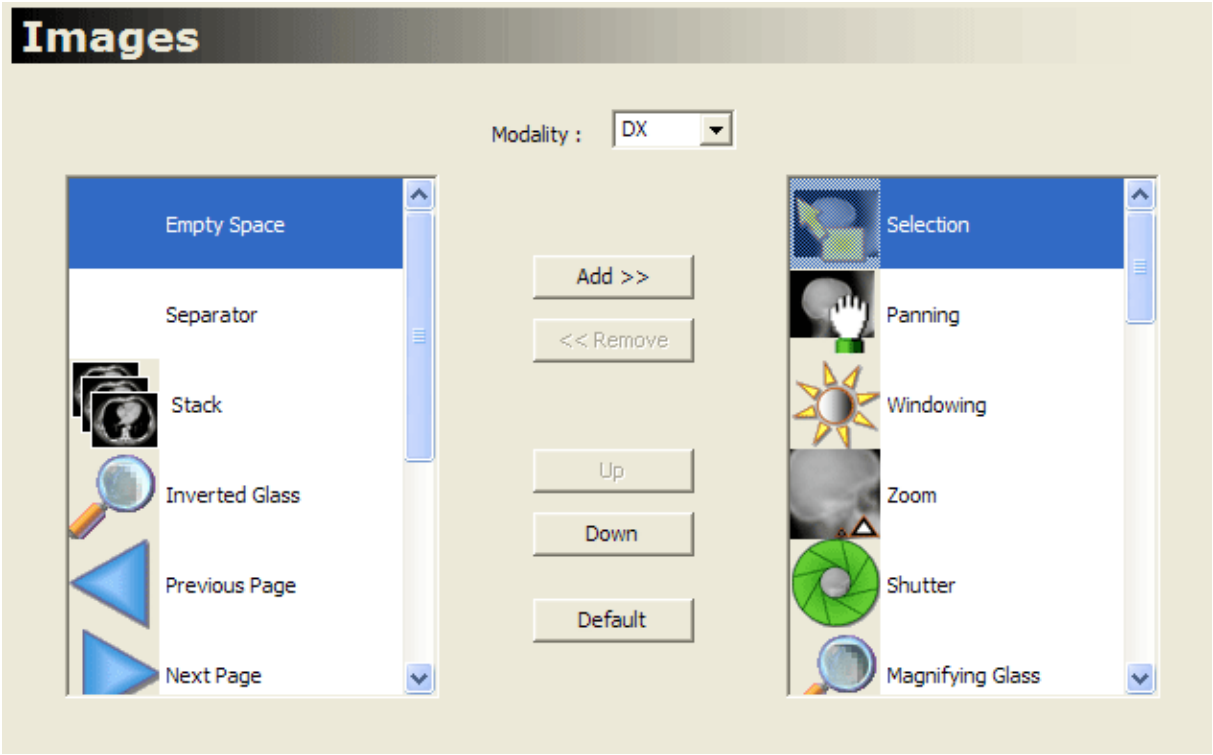
44.11 Study toolbar

- Each user may specify the content of the Examination and Image tool bar.
- Selecting the icons in the study toolbar.
- Any change to the bar will apply to everyone if there is no user management.



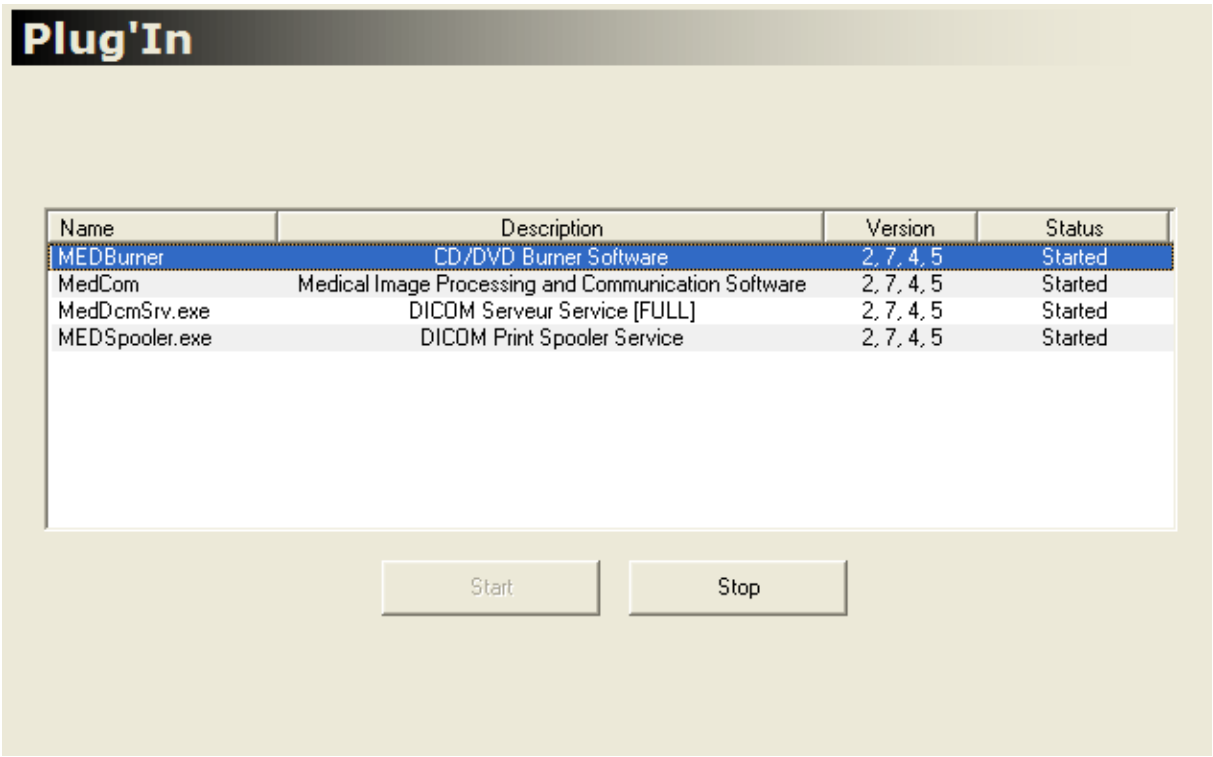
44.12 Image toolbar

- Each user may specify the content of the Examination and Image tool bar.
- Selecting the icons on the Image tool bar.
  - Any change to the bar will apply to everyone if there is no user management.



44.13 Services

The list of services associated with the station may be displayed during operation. It is possible to start or stop services.

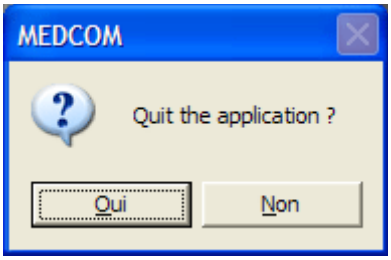


45 Exiting the software

There are three options to exit the software

- Click on the icon:
- Click on the X in the top right of the main window.
- Pressing the ALT and F4 keys.

The confirmation dialog box opens.



Click on YES or No to cancel the action.

46 Software Revisions

Software modifications are presented below. Version numbers may not be sequential : some version numbers are used for intern reasons only.

46.1 3.1.1 Version

46.1.1 New features

- Folder source in study list : handle DICOM images with any extension.
- Linking images button to perform action on all displayed images.
- Display 'study' toolbar on two lines when needed.
- Handle reception, disaply and export of Multi-Frame images (US, XA, RF, BT modality) of any size.
- MEDMAMMO :
  - Identification of images with prior images, and switch for display.
  - Identification of images with similar images, and switch for display.
  - Identification of images with tomosynthesis images, and switch for display (TOMOSYNTHESIS Option).
  - Scroll in frames for tomosynthesis images and display corresponding position (TOMOSYNTHESIS Option).
  - Identify relevant frames and navigate within relevant frames (TOMOSYNTHESIS Option).

46.1.2 Corrections

- DICOM images reception : configuration to disable patient integrity.
- Closing studies on third screen.
- Study List dialog boxes position..
- Displaying incrusted magnifying glass.
- Date filter applied on virtual folders.
- Load images from print job list.
- Image export with annotations and measures.
- Intersection angle printing.
- Advanced stitching on 16 bits images.
- Saturation filter on 16 bits images.
- Burn status of studies.
- Add default HP for MG LM images.

- Scale display for several MG images in Print Mode.

46.2 3.1.0 Version

46.2.1 New features

- New database engine, increasing performances.
- Handle DICOM overlays display.
- MEDMAMMO : breast detection improvement.

46.2.2 Corrections

- Job list crash.
- Patient information modification.
- Add a new version of automatic stitching algorithm.
- Allow small difference on Pixel Spacing Tag for stitching.
- Patient integrity : improve handling of empty birthdates.
- Loading images from job list queue.
- Gono angle printing.
- Improve calibration.
- Burning images with annotations ans measures.
- Burning studies with deleted images.
- Stitching module : contextual menu for Gono angle.
- JPEG Export.
- Constrast limitation.
- Study List traduction.
- Saving identification configuration.
- Intersection angle printing.
- Correction on 'Change Tag Value' plugin.
- Crash when adding stitched image if configuration with 'Save Pagination'.
- Positionning of full image with thumbnail in stitching module.
- Windows Print - A3 format.
- Save film session' Configuration.
- Remove icons on images when too much images displayed.
- Dialog box for print confirm.
- MEDCommand LOAD_STUDY_PRIOR.
- Integrity conflict if patient name with double quotes.

46.3 3.0.4 Version

46.3.1 New features

- Virtual folders to enables studies classification for later retrieval.
- New measurements.
- Dicom Server can keep images up to 500GB (or more if option activated).
- Image import is now performed in background.
- MIP-MPR module – 3D Rendering.
- Print allowed on Multiframe images (with number of selected images information)
- Stitching mode:
  - Grid tool
  - Auto positionning in gonio measures
  - Panning tool through overview
- Direct view of availables printers in main toolbar with combo selector
- Save study with annotations
- Dynamic management for MEDMAMMO TouchScreen resolution

46.3.2 Corrections

- Dicom nodes port and aet configuration
- Dicom Routing with a filter on DICOM Tag.
- Update of area measure.
- Correct DICOM Tag 'Photometric interpreation' when creating images.
- Install on Japanese OS.
- Image display in Russian language.
- Keep print layouts when updating a version.

46.4 3.0.2 Version

46.4.1 New features

- Windows Print with same user interface as DICOM Print ("Print Mode").
- Burner fully integrated (no need for NERO installation anymore).
- Automatic Dicom Store when adding Stitched images and modified images.
- Allowing ES Modality.
- MEDMAMMO : Additional Touch Screen to improve workflow.

46.4.2 Corrections

- Crash du spooler.
- Spooler Crash.
- Error message when Nero is not installed is now removed.
- Using keypad for 'manual stitching'.
- Performing stitching on images with overlays.
- Removing lengths on gonio angle measure.
- Duplicating an image in shutter mode : shutter plots visible.
- Printing several images with a correction LUT.
- Printing MG images with correct alignment.

46.5 3.0.0 Version

46.5.1 New features

- New image display engine :
  - Reducing image flickers.
  - Improving Zoom rendering.
  - Displaying measure results dynamically.
  - Windowing on color images.
- Windowing and Image processings now available on all types of monochrome images, not only DICOM.
- New measures :
  - Baby HIP Dysplasia
  - Alternative advanced gonio angle.
- Stitching :
  - thumbnail to localize displayed area.
- Two Print modes available : simple and advanced.
- MEDMAMMO:
  - Breast detection for alignment of images.
  - Breast Detection for video inversion.
  - Breast Detection for windowing.
  - 1:1 Quad-Zoom with thumbnail to localize displayed area.

46.5.2 Corrections

- Command Line execution with Accession Number.

- Burning images with LUT.
- Modifying patient information : correct birthdate.

47 Revision

Latest manual revision : 23/04/2013.